Minimoog

Voyager XL

User's Manual



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Foreword

In early September 2005, Ileana Grams Moog asked me to go out to Bob's place in the country and see what the state of his workshop was. That day in North Carolina was impossibly beautiful. As we drove up a long, windy gravel driveway in Turkey Cove, we came to this idyllic spot surrounded by mountain laurels, oaks and babbling creeks. Standing there was a steel outbuilding eerily similar to my own workshop. This was the place Bob called "Big Briar".

Feeling a bit like Indiana Jones, we figured out which old key opened the building and turned on the lights. Piles of papers, parts of electronics, old synthesizers, solder, screws, knobs, and tools were scattered everywhere. Since I never had the chance to know Bob very well, I felt a little bit like I was transformed back to a time when he must have been busy tinkering in his shop plying his unique blend of intuition and intelligence.

After about an hour of poking around, my foot hit something hard on the floor – I looked down and there was a black trash bag at my feet, just lying there like it had been abandoned and forgotten.

I opened it up and it was one of those moments when angels actually sing (of course, this time the voices sounded very much like something from an old Wendy Carlos track…).

Inside this bag was a Minimoog in pristine condition. On it was a plaque stating it was one of the last 25 made on the Minimoog line. I just started laughing. How BOB! This is how I was slowly starting to know him better; this mythic instrument was probably brought in one night, placed on the floor as he headed to his workbench to finish some circuit, and then forgotten.

The Minimoog has a very special place in the history of electronic instruments. They are loved, played, abused, coveted, hidden away so as not be touched, talked about, blogged about, and on and on. They were noisy, unstable, quirky, funky – everything that makes for a great soulmate! Now it's 40 years later, and the Voyager XL was born out of the desire to celebrate this history.

When we at Moog discussed this project, we decided that we needed to celebrate more than the Minimoog per se, but the larger legacy of Bob's work. To hark back to the original modular approach and to encourage musicians to really take advantage of what I consider to be the singular most important aspect of our instruments: the Control Voltage. Something so basic and simple but it is still revolutionizing the world of sound.

The XL was born out of a lot of evolving ideas both internal and external since I have been here with Moog. The request for a larger keyboard, the desire for Ribbon Controller, and for more LFO sources with different ranges to further expand a musician's ability to modulate – one of the most fundamental aspects of musicality.

We also felt strongly that this needed to be on the front panel. All these features needed to be immediate, playable, and fully analog – they DEMAND you to craft your sounds and to architect your soundscapes in the organic way that made the original modulars so magical.

The XL's larger keyboard allows you to create much longer harmonic ideas but should also encourage you to use this keyboard as a polyphonic controller and then further blow down the sonic doors by feeding this polyphonic source back into the Voyager via the External Audio adding a whole other dimension of possibilities!

I am extremely excited about this instrument. It, of course, builds upon the Minimoog Voyager–Bob's seminal synthesizer–yet adds another option to our family of synths from the small (our new SLIM Phatty) to the large (the Voyager XL). Each of these instruments have their own personality, their own voice, and excel in different ways. But they all are direct descendants of that funky little Minimoog sitting on the floor of Bob's workshop that I stumbled upon accidentally that day. They are all direct descendents of the passion that you, the artists, have put into making your voice heard through this incredible legacy.

As with any instrument, we spend many, many hours discussing and debating features with our customers. I am extremely appreciative of the huge contributions and always-informative conversations with Moog guru Brian Kehew, as well Drew Newman, Eric Levy and Roger O'Donnell among others. This continual collaboration with the artists who use our instruments allows us to craft tools that meet the visions and inspirations of folks like yourself.

HUGE thanks to my incredibly brilliant and dedicated engineering team: Steve Dunnington, Amos Gaynes, Rich Shaich, and Eric Church. Nothing is possible without them (including my sanity!). Special thanks to Rudi Linhard, Axel Hartman, David Rankin and Core Design for their expert contributions. To the terrific team at Moog who are involved in building, shipping, and selling instruments around the world – you are a wonderful bunch! Thanks to the tireless efforts of our marketing team which gets the news out to you and beyond and also continually strives to keep Bob's vision alive. Thanks also to Greg Kist for this incredible manual – a treasure trove of knowledge and help on the instrument.

To all of you who continually give us your ideas, your passions and your music – you are the bedrock of Moog Music. We appreciate you all and honor what you do with our instruments. We can't wait to hear what you do with the XL.

Finally, without Mike Adams, our president, Moog Music would not be here and especially not continue to maintain the excellence of spirit and intention through these times. His tireless work and fortitude cannot be understated. The fact that we are here to celebrate the 40th anniversary of the MiniMoog owes a lot to his vision and skills.

This morning I brought the first working XL home and plunked it down in my living room. My six-year old son's eyes lit up and he jumped up on a little chair, turned it on, and immediately started crafting his own sounds, plugging cables in and out, listening, adjusting and grooving – *for over an hour until I unplugged it so I could get back to work (he was not happy about that)!*

Now it's your turn!

It brings me great pleasure to present the Minimoog Voyager XL to you. I hope it brings you a lifetime of pleasure and inspiration.

Sincerely,

Cyril Lance
Senior Engineer and Chief Technical Alchemist

How to Use this Manual

This User's Manual is organized into convenient sections to assist you in setting up, playing and exploring your new Voyager XL.

The *Setup and Connections* section explains how to unpack, setup and connect the Voyager XL, and provides a quick start to get you up and running with your new instrument.

The *Components* section offers detailed explanations of the Voyager XL components that create and modify sound.

The *Panel Mode*, *Edit Mode* and *Master Mode* sections provide in-depth descriptions of the Voyager XL menus, options and operation.

The *Appendix* provides additional information, such as technical specifications, service and support info, and making connections to optional external equipment. First time users should read Appendix D *Synthesis Tutorial*, where you will find an explanation of sound and subtractive synthesis.

For those interested MIDI interface specifics, see the section titled *How the Voyager XL handles MIDI,* as well as Appendix E, *MIDI Implementation*. Those who are new to MIDI should first read *MIDI Basics*, found in Appendix B.

At the back of the manual, you'll find a Glossary that defines important synthesizer terminology, and a table listing all of the Voyager XL Presets.

Icons

Throughout the manual you will see icons that offer additional information. Here's what they mean:

 This icon indicates an important note concerning the operation of the Voyager. XL

 This icon indicates a useful performance or programming tip.



This icon indicates technical information for the advanced user or the technically curious.

Setup and Connections

For those of you who can't wait to play your new Voyager XL synthesizer (completely understandable!), The following should get you set up and running quickly.



We encourage you to read the entire manual at some point to learn more about the instrument and gain a better understanding of what you can do with the Voyager XL.

Check the contents in the shipping carton

The Voyager is shipped with the following items:

1. The Voyager XL Synthesizer
2. Patch Cable Kit
3. Power cord
4. This User's Manual
5. Warranty registration card

What you will need

In addition to the Voyager and provided accessories, you will need:

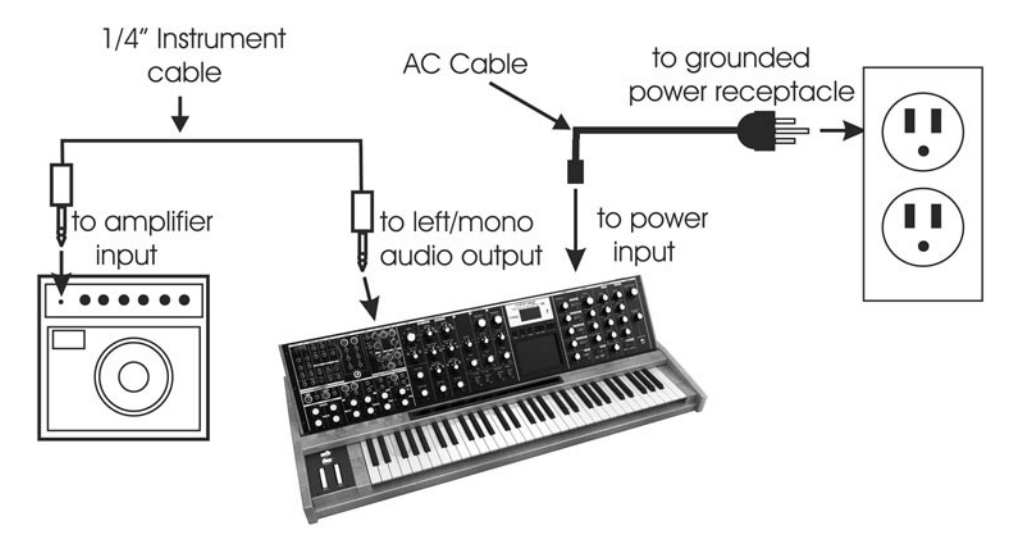
1. A stand or table sufficient to support the Voyager XL
2. A ¼" instrument cable (for mono) or two ¼" instrument cables (for stereo) and an amplifier, or a pair of headphones
3. A properly wired AC outlet.
4. A few ¼" patch cords for trying various connections

Set up

Make sure you have an adequate place to set it up. You will need a sturdy keyboard stand or flat surface that will provide the proper support and will not easily topple. Use caution when lifting the Voyager XL out of the carton, and be sure to save the carton and all packing material in case you need to ship the Voyager XL for any reason.

Connect to Power and Amplifier

Make the connections as shown below. Connect the Voyager XL's power receptacle (on the back panel) to a wall outlet using the supplied AC power cord. The Voyager XL universal power supply will operate with a power source from 90 to 250 Volts AC, 50/60Hz. Do not switch on the power yet. Set the Master Volume control to minimum before making the connection to an amplifier or headphones.



Now Power up

Turn the Voyager XL power ON. The LCD screen will light up and display an "XL" start-up message. After a few seconds the start-up screen will disappear and the current preset will appear in the display. The name of the current preset location (bank and preset number) will appear on the top line and the preset name will be displayed on the middle line of the LCD screen:



Test for Sound and Set Levels

Play a few notes on the Voyager XL keyboard while turning up the volume of your amplification. Set the volume to a comfortable listening level.

Start Playing

Use the **-1/+1** buttons to scroll through the presets. All preset locations are loaded with sounds from the factory (128 presets each in 8 banks). There are a total of 1024 preset locations in memory – 896 of which are user programmable. Note that once a preset is called up, you can tweak the parameters to your liking using the front panel controls. Any changes made to the current preset will cause the display to change as shown, with asterisks added to the preset name indicating that the preset has been modified:



If you make changes to a preset and want to return to the original sound, simply press **ENTER**. You can toggle between the stored preset and the current edited preset by pressing the **EDIT** button and selecting the COMPARE TO PRESET function. This function will allow you to toggle back and forth between the original preset and the edited preset using the **CURSOR** button (for more on the COMPARE TO PRESET function, see page 51). If you wish to save your changes, press **EDIT** and select the SAVE PRESET function (for more on the SAVE PRESET function, see page 64). Any changes made to a preset will be lost if they are not saved once you change to a new preset.

Making Your Own Sounds

To create your own sound from scratch, it's good to start from the Voyager XL default parameters. This can be done by the 'Initializing Parameters' command. Press the **EDIT** button, and press the **+1** button until INIT PARAMETERS is highlighted, then press **ENTER**. Use the **CURSOR** button to select 'Yes' and press **ENTER**. This loads the default parameters temporarily into the current preset location. The default sound is a basic one-oscillator square wave sound–think of it as a blank canvas for your sonic creations. Try the controls to the right of the Mixer, one at a time, starting with **FILTER CUTOFF**, and notice how they affect the sound. Then try combining different tones with the Mixer and Oscillators 2 and 3. Finally experiment with the Mod Busses to see how different types of Modulation affect the sound.

To operate exclusively from the front panel and not from the presets, the 'Real Panel Parameters' must be loaded. First initialize the parameters as described above. Then press the **PANEL** button twice. Use the **-1** button to highlight 'REAL PANEL PARAM'. Press **ENTER**, and you will see the prompt 'Load actual panel parameter? Yes/No'. Use the **CURSOR** to select Yes and press **ENTER**. The sound produced by the Voyager is now determined by the settings of the front panel independently of preset memory.

When working with the Voyager XL, keep in mind that many of the controls are interactive, so there is frequently more than one way to control a single parameter. This may be a source of confusion. For instance, if the Sustain level of the Volume Envelope is all the way down, and the Attack and Decay times are at zero, there will be no output. In another example, if you have a sound where the **AMOUNT TO FILTER** control for the Filter Envelope is at zero, then changing the Filter Envelope **ATTACK** control will likely result in no audible change. To use your Voyager XL to its fullest potential, it is very important to understand the workings of all the controls and how they interact in order to understand how a sound (or lack thereof) is produced. Don't get frustrated, simply work systematically until you know what each control does and how it interacts with other Voyager XL parameters.

Warranty registration

Moog's on-line warranty registration system is the best way to activate your warranty. Access the Moog web site at www.moogmusic.com and click on the "Product Register" tab. If you complete all the requested information, Moog Music will send you a complimentary gift.

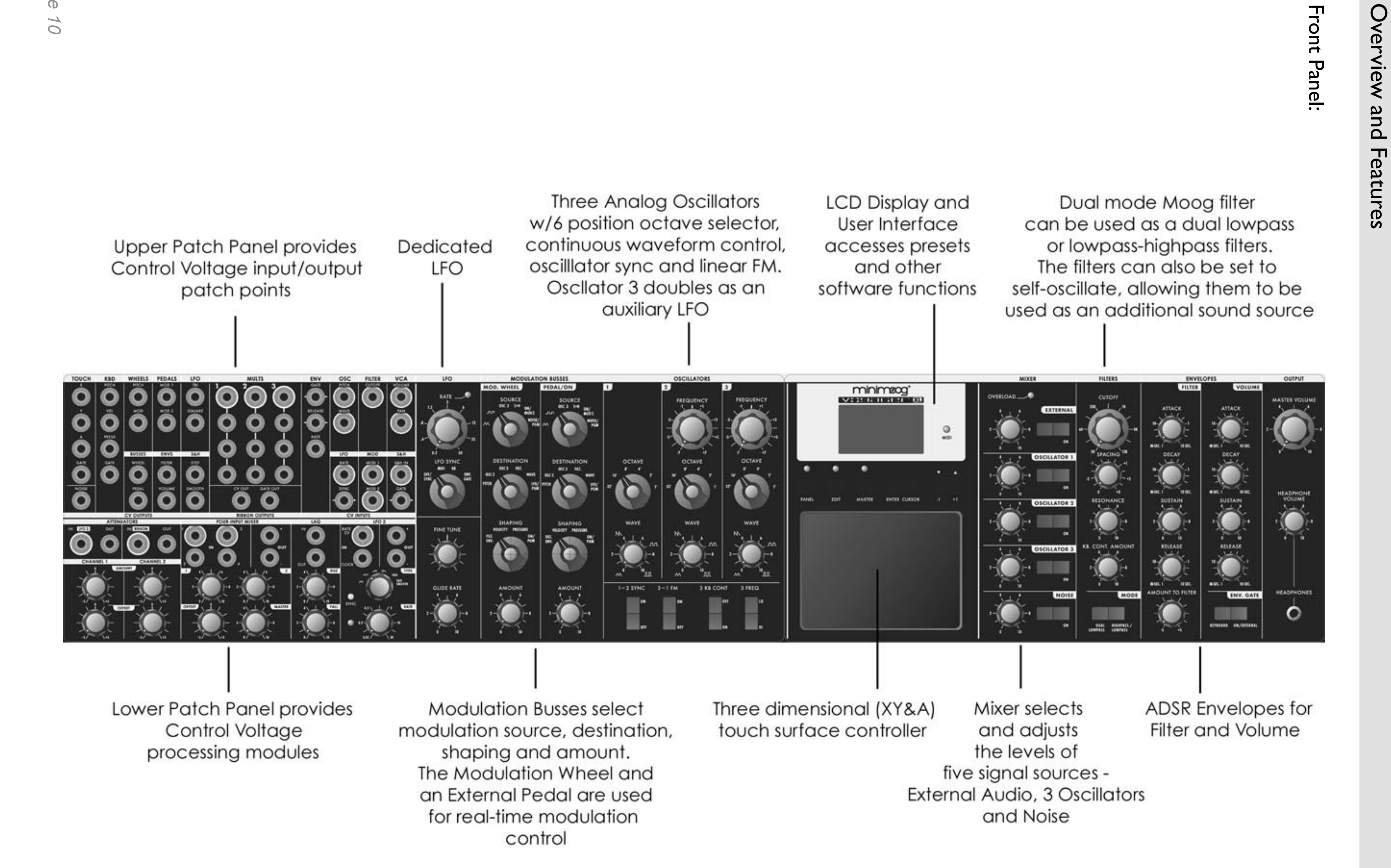


The Voyager XL is recommended for an operating temperature between about 50 and 100 degrees Fahrenheit. It is safe to operate the synthesizer outside of this range (between 0 and 125 degrees F), but the Voyager's voltage controlled oscillators (VCOs) may not remain in tune.

It is recommended that a warm up period of about 15 minutes be allowed before using the Voyager. This warm-up period is necessary for the proper operation of the VCO's (the warm up period may be longer if the Voyager XL has been stored outside the recommended operating temperature range).

Overview and Features

Front Panel:



Back Panel:

Wide range power input accepts 100-240VAC

Connector for gooseneck lamp (Lamp 1)

External Audio Input

Left and Right Audio Outputs

MIDI In, Out and Thru

Effect Loop Insert jack

Connector for gooseneck lamp (Lamp 2)

Signal Flow

To understand the Voyager XL internal signal flow, it's helpful to consider the three types of signal routings in the system: the audio path, the control voltage path, and the modulation path.

Audio Path

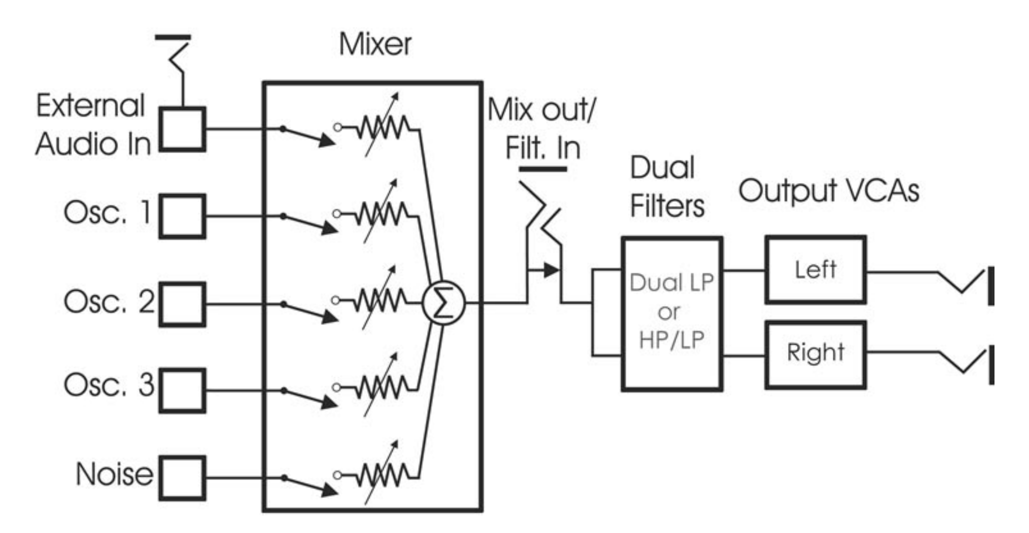
The Voyager XL audio path includes all of the signal sources and signal modifiers that produce an audio output. These include the oscillators, mixer, filters and amplifiers (VCAs).

The Oscillator section includes controls for selecting the octave and waveforms, adjusting the tuning of the second and third oscillators, for setting the oscillator sync and linear FM functions, and for setting the frequency range and keyboard control for Oscillator 3.

The Mixer section is where the oscillators and other sound sources (noise and external input) are selected and mixed together. The output of the Mixer section is routed to the Filter section through a Mixer Out/Filter In jack on the Voyager's rear panel. This jack allows you to interrupt the signal routing between the Mixer and Filter to insert an external effect, or take the output of the Mixer directly.

The Filter section is responsible for altering the harmonic content of the combined sound sources. The Voyager's Filter section contains two filters that work together in two different modes: Dual LP and HP/LP. Dual LP mode features two lowpass filters in parallel, while HP/LP (Highpass-Lowpass) mode features a lowpass and highpass filter in series, creating a Bandpass filter response. In either mode, the Filter Cutoff control affects the cutoff frequency of both filters, and the Spacing control is used to adjust the difference between the cutoff frequencies. The outputs of the filters are routed to the Voltage Controlled Amplifiers (VCAs).

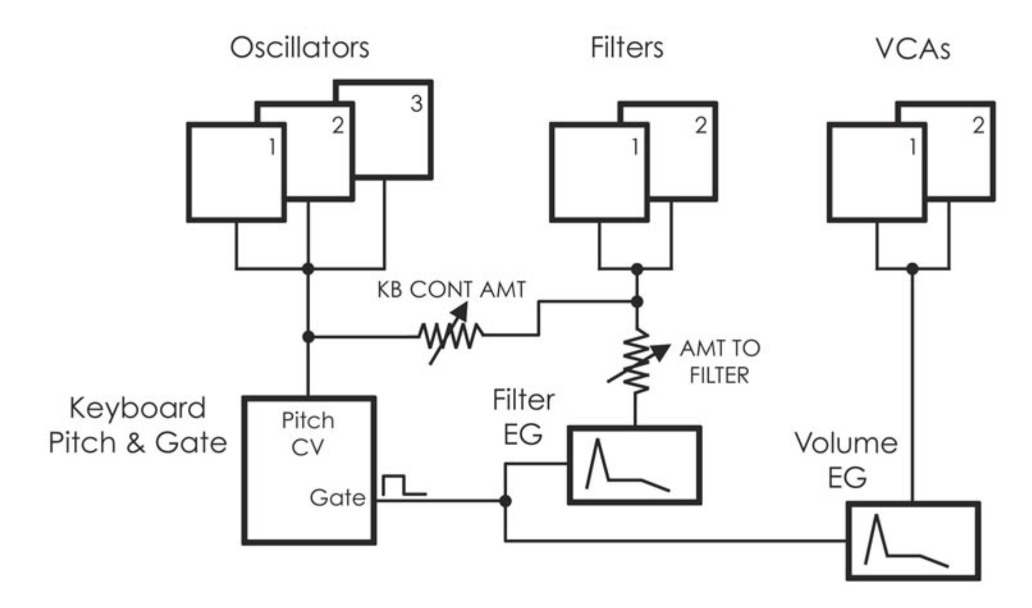
The VCAs shape the volume level of the audio signal using time-varying control signals called Envelopes. The Envelopes section (part of the control voltage path) contains one Envelope Generator to control the Filters, and one Envelope Generator to control the VCAs. The Voyager's audio path is illustrated below.



The Voyager XL Audio Path

Control Voltage Path

When a key is pressed, or a MIDI Note On message is received, a Gate and Pitch Control Voltage (CV) are produced. The Gate signal is used to trigger both the Filter and Volume Envelope Generators (EGs). The Pitch CV is used to determine the pitch of the Oscillators and can be applied to a varying degree to the Filters through the Keyboard Control Amount knob. The basic control voltage path is illustrated below.

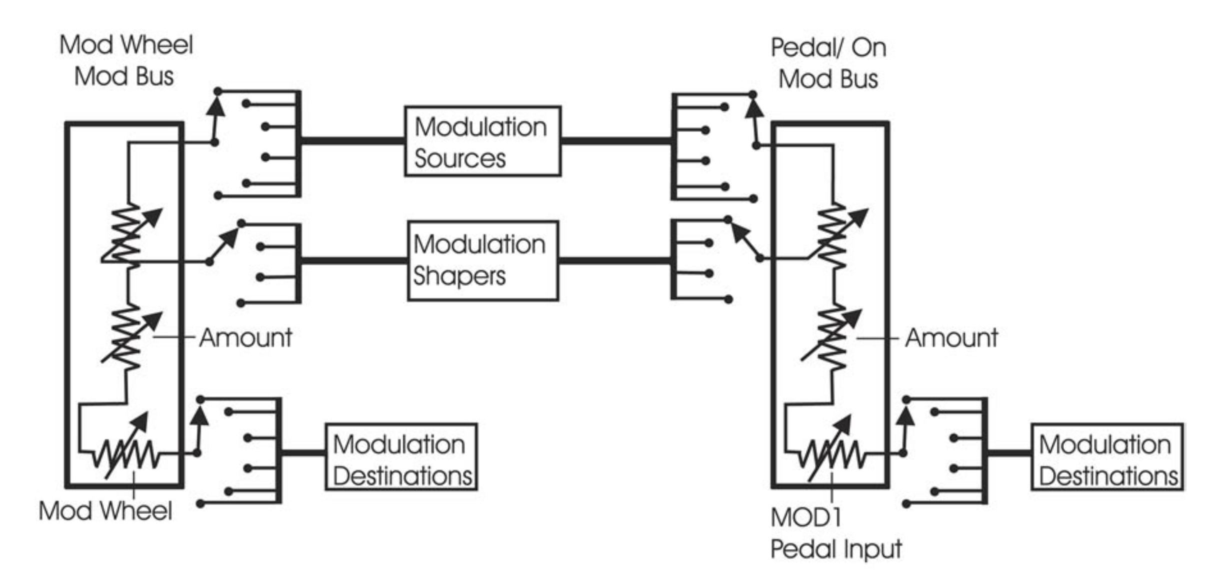


The Voyager XL Control Voltage Path

Modulation Path

Modulation is performed through the Modulation Busses. There are two separate Mod busses. One is controlled by the Mod Wheel, while the other is controlled by the MOD1 CV (a CV input on the Patch Panel). The MOD 1 CV input is normalled to +5V, so with nothing plugged into this jack, the PEDAL/ON bus is on at the level determined by the PEDAL/ON Amount control. In each Mod Bus, a Modulation Source, Shaping signal and Destination are selected. An overall maximum modulation amount can be set with the Amount control. The Modulation Buss routing is illustrated in the figure on the next page.

The Voyager's Low Frequency Oscillator (LFO) is assigned through the Modulation Busses. The LFO features a triangle and a square wave, and both waves can be used at the same time. The LFO is also used to trigger the Sample and Hold circuit, which means the speed of the Sample and Hold is adjusted by the LFO **RATE** control.



The Modulation Buss Path

Additional Modulation

The Touch Surface controller can control three parameters simultaneously. The position of a finger on the touch pad generates a control voltage for the horizontal (X) position and a control voltage for the vertical (Y) position. Pressing on the touch surface generates a control voltage based on the area (A) of the fingertip. A light touch causes less of your fingertip to touch the pad, while a heavy touch causes more contact with the touch surface. Touch Surface Controller parameters (X & Y) are available as Modulation Sources for both the Mod Wheel and Pedal/On busses through Edit Mode programming (See Edit Mode 2.1 & 2.3 - 'PGM M-WHL SOURCE' and 'PGM PEDAL SOURCE'). The four Touch Surface parameters (X, Y, A & Gate) can also be programmed as modulation destinations through Edit Mode programming (see Edit Mode 5.1 - 'T.S DESTINATIONS').

Many more modulation possibilities are available through the Voyager XL's Modular Patch Panel. The Patch Panel offers an endless array of powerful modulation and control possibilities that go far beyond the built-in features already mentioned - all you need is a few patch cords!

Digital Features

The Voyager has three operation modes: Panel, Edit, and Master. Panel Mode is used for accessing and performing with the Voyager's 7 banks of 128 user-writable presets (896 presets total). Panel Mode has a menu that can be accessed for performance related functions such as "parameter display" which shows stored and edited values as you edit a preset. Edit Mode contains all Voyager XL functions that can be stored in a preset that are not set by the front panel controls, such as naming presets, and some advanced functions like Pot Mapping, or Filter Poles. Master Mode is used for global settings, such as MIDI In and Out channels.

Digital Features (con't)

A Voyager XL preset is basically a "snapshot" of front panel settings combined with the parameters set in Edit Mode. The preset that is loaded is referred to as the "Current Panel Preset" and is stored in a memory buffer separate from the presets. This preset can be edited freely. The parameters are set by the Voyager XL preset memory until a setting is changed, at which time the current position of that control takes over. The Voyager has both a 'Compare', and 'Recall Last Edit' sound function. Changes to a preset can be saved to any of the 896 preset locations using the Edit Mode function 'Save Preset'. There are three ways to change Presets:

1. Use the **-1/+1** buttons.
2. When the External Audio On/Off switch is OFF, the **EXTERNAL** level control can be used to quickly scroll through the entire current bank. When the desired preset is reached, pressing the **ENTER** button will load the new preset. (For more on using this function, see QUICK MODE, on page 47).
3. The Voyager XL responds to MIDI Bank Select and Program Change messages.

For storage and recall of more than 896 presets, Moog Music recommends purchasing the Voyager Editor/ Librarian, a Mac/PC program designed for creating, organizing and archiving presets for the Voyager family of products. It can be purchased from the Moog Music website (www.moogmusic.com).

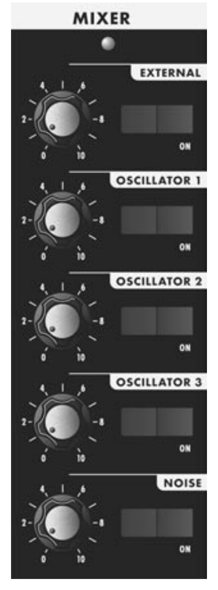
The Voyager XL has a full MIDI implementation. Its front panel rotary controls and switches send MIDI CCs, and the Voyager XL synth engine receives and responds to these same commands. Presets can be sent as SysEx data to a computer for storage, and the Voyager XL can receive SysEx data either for single presets, preset banks, or for operating system updates.

The Components

Now let's take a look at the individual module components that make up the Voyager XL, starting with the Mixer section. Then we'll move on to the other panel functions (Oscillators, Filters, Envelopes, etc.), performance controls (Keyboard, Ribbon and Left-Hand controls) the Modular Patch Panel, the Back Panel, and finally the User Interface section.

A. The Mixer Section

The Mixer combines the main sound sources of the Voyager XL. It's a good place to start when creating a new sound from scratch, or figuring out how a sound is put together. All five of the Voyager XL sound sources can be switched ON or OFF, and their levels can be individually adjusted.



The five sound sources are:

- External Audio Input
- Oscillator 1
- Oscillator 2
- Oscillator 3
- Noise Source

Each sound source in the Mixer has a dedicated ON/OFF switch and a level control.

The audio output of the Mixer is routed to the Filter through an insert jack on the Voyager's back panel. If an insert cable is plugged into this jack however, the Mixer output be routed through an external effect and returned back into the Voyager's signal path. This jack can also be used as direct output of the Mixer if desired (see page 17 for more information).

Mixer Section Controls:

Oscillator 1, 2 & 3:
The **OSCILLATOR** controls in the Mixer allow each oscillator to be switched ON or OFF , and mixed in any proportion. When the levels of the oscillators are set high, the output from the Mixer gently overdrives the Filter section. This was one of the important features in the original minimoog that gave it its characteristic "fat" sound.

Noise:
The **NOISE** control is used to mix noise with the other sound sources. In the Voyager, noise is a white/pink hybrid. It is useful for making ocean wave sounds, explosions, wide sounds, or adding subtle coloration to a sound.

External:
The **EXTERNAL** control allows an external monophonic audio source to be routed into the Mixer, where it can be mixed with the Oscillators and Noise source (an "Ext Audio In" jack on the Voyager XL back panel is provided for this input). The LED above the **EXTERNAL** control knob begins to light up as the input signal overdrives the Mixer input. When the light is faint, a small amount of soft clipping is occurring. When the LED is bright, the signal is strongly overdriven. Judicious use of overdrive can really fatten up a sound. The External Audio Input can accept a signal from instrument level to line level.



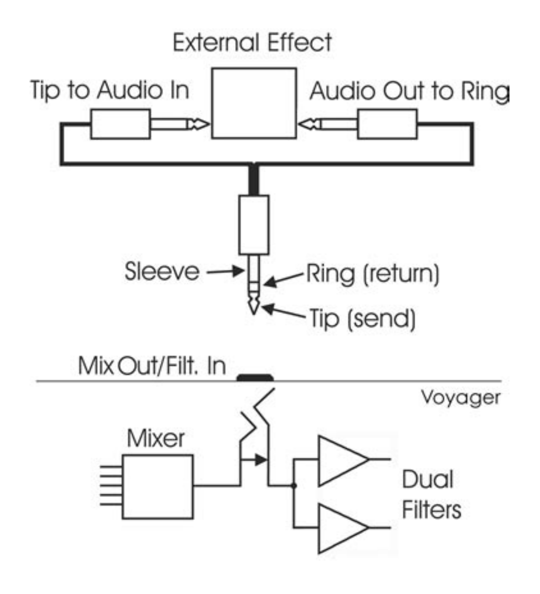
A secondary function of the EXTERNAL control knob is that it can be used to scroll through a bank of presets when in PANEL mode when the EXTERNAL switch is set to OFF. For more on this feature, see 'Quick Mode' on page 47.



You can use the External Audio Input jack to route the Voyager XL output back into itself. This classic feedback trick is a great way to produce a thicker, meatier sound when the gain is properly set with the EXTERNAL control knob.

Mixer Back Panel Connections:

Mix-Out Loop:
The jack on the back labeled "Mix Out/Filter In" is an insert point between the Mixer output and the Filter input. Using a standard insert cable, an effect such as a moogerfooger® MF-102 Ring Modulator can be inserted to add effects to the oscillator, noise source, and external audio in prior to the Filter stage. The Mixer output signal appears at the tip of the insert cable jack as shown below. The return signal is applied to the ring of the jack. A cable fully plugged into the jack breaks the connection between the Mixer and the Filter, and unless the Return signal is sent to the ring of the jack, no signal will pass through to the Filter. The level settings in the Mixer affect the output level, so keep this in mind as you try different devices in this loop.



The Mix-Out loop adds tremendous flexibility to the powerful sound creation abilities of the Voyager XL!



Got a few guitar stompboxes laying around? The Mix-Out loop allows you to easily insert guitar pedal effects into the Voyager XL signal path. What to try? Nearly any type of sound effects device or sound modifier is fair game (chorus, phaser, flanger, overdrive, distortion, graphic/parametric EQ, tube preamp, exciter, etc.) and worth checking out. As always, experimentation is encouraged!

B. The Oscillator Section

The Oscillators are the main sound source of the Voyager XL. The oscillators are all analog Voltage Controlled Oscillators, or VCOs. They feature a temperature regulation circuit that provides them with excellent tuning stability. The VCOs can produce a total musical range of 8 ½ octaves! In addition, the frequency of oscillator 3 can be set to the sub-audio range (<20Hz) for use as an auxiliary LFO.



Oscillator 1 performs as a master oscillator to which Oscillator 2 and 3 are tuned. The timbres of the oscillators are adjusted by their variable Waveform controls. In addition, there are switches for Oscillator 2 sync to 1; linear frequency modulation of Oscillator 1 by 3; Oscillator 3 keyboard control on/off; and Oscillator 3 Lo or Hi frequency range. The frequencies of the Oscillators are controlled by a number of sources. The main source is the pitch CV generated by keyboard or by MIDI Note ONs. A glide circuit can be switched in between the Keyboard CV and the oscillators to slow the voltage changes between notes, resulting in a glissando effect. The Keyboard CV then is mixed with the Octave switch CV, the Frequency control (Oscillators 2 and 3), the Pitch Bend Wheel, the Fine Tune control, and the output of the Mod Busses when the 'Pitch' destination is selected.

Oscillator Section Controls:

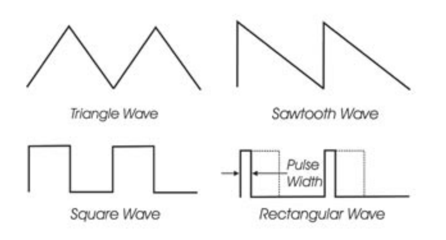
Octave:
Each Oscillator has a 6-position **OCTAVE** switch that selects the relative frequency range. To hear how it works, turn off Oscillators 2 and 3 in the Mixer. Turn Oscillator 1 on and set its level to 5. Play a note on the keyboard and rotate the Oscillator 1 octave switch clockwise one click – the note will rise an octave. You can use this control to change the frequency range that the keyboard controls. The panel markings 32' up to 1' are octave standards based on organ stops. On the 16' setting, MIDI Note number 93 is A440 (equivalent to the "A" key above middle C) .

Frequency:
Oscillators 2 and 3 have a **FREQUENCY** control. When the control is in the center position, the oscillators should be in unison with the frequency of Oscillator 1 (when the octave switches for all three oscillators are in the same position). The Frequency control can change the pitch of Oscillator 2 or 3 a total of +/- 7 semitones relative to Oscillator 1. This allows more than one frequency to be played when a key is pressed. Adjusting the frequency of Oscillator 2 & 3 to be slightly out of tune with Oscillator 1 results in the classic "oscillator beating" chorus sound.



NOTE: The Oscillator FREQUENCY controls have no calibration - sometimes unisons are made with the controls a little left or right of center. Oscillator 1 does not have a Frequency control because it is designed to serve as a reference oscillator for the other 2 oscillators.

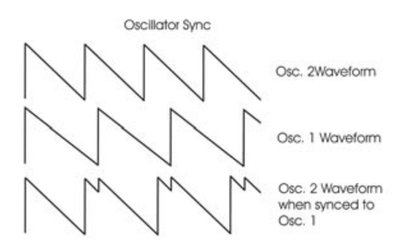
Wave:
Each oscillator features a continuously variable **WAVE** (waveform) control. The legend on the front panel shows the pure waveforms that are available. They are triangle, sawtooth, square, and rectangular. The waveform is morphed gradually from one to another as the waveform control is rotated. Because the waveform is voltage controlled, this parameter can be modulated; this generates some very interesting timbral changes. By limiting the modulation between the square and skinny pulse waveform, you can get pulse width modulation. Although the waveforms can be set from the front panel individually for each oscillator, modulation through the Mod Busses is applied to all three waveform controls simultaneously. When using modulation, it is possible to make the width of the rectangular wave so skinny that it becomes silent.





TIP: Several factory presets illustrate the use of extreme modulation to force the rectangular wave to silence. For examples, check out the "Waveform Dance" and "Relaxation Drone" presets.

1-2 Sync:
The **1-2 SYNC** switch is one of four switches located at the bottom of the oscillator panel. In the ON position, the **1-2 SYNC** switch synchronizes Oscillator 2 to Oscillator 1. Oscillator sync is an effect caused by resetting an oscillator waveform's start point with another oscillator as shown here (the effect is more noticeable if the synced oscillator is a higher frequency than the reset oscillator). The main frequency heard is that of the reset oscillator. As the frequency of the synced oscillator is swept, it reinforces the harmonics of the reset oscillator. Depending on how it is applied, the effect can be aggressive or warm and vocal. This effect is much more dramatic when Oscillator 2 is set to a higher octave than Oscillator 1.



3-1 FM:
In the ON position, the **3-1 FM** switch establishes direct linear Frequency Modulation (FM) of Oscillator 1 by Oscillator 3. When an Oscillator is used as a CV source for another VCO, it is called frequency modulation. Frequency modulation effects can vary from vibrato or trill effects to clangorous inharmonic sounds to rich timbres that evoke acoustic sounds. Linear FM is the kind of frequency modulation used in classic FM synths.

3 KB Cont (Oscillator 3 Keyboard Control):
The **3 KB CONT** switch disables keyboard control of Oscillator 3 when in the OFF position. By disabling the keyboard control, you can use Oscillator 3 as a drone or as a modulation source whose frequency doesn't change with the key played. In addition to turning off the keyboard control of Oscillator 3, switching to OFF increases the amount by which the Oscillator **FREQUENCY** control changes Oscillator 3's frequency.

3 Freq (Oscillator 3 Frequency):
The **3 FREQ** switch selects Oscillator 3's frequency range. When the switch is in the LO position, Oscillator 3 operates as a sub-audio sound source (producing clicks) or as a modulation source (auxiliary LFO). When the switch is in the HI position, Oscillator 3 operates with the same available frequency range as Oscillator 2.

Related Oscillator Controls:

Two other panel controls interact with the Voyager XL oscillators: Fine Tune and Glide. These controls are located to the lower left of the Modulation Busses section



Fine Tune:
The **FINE TUNE** control is used to tune the oscillators ± 2 semitones for matching an external reference pitch.

Glide Rate:
Glide enables a glissando effect between notes. The **GLIDE RATE** control adjusts the rate of the glissando. The glide rate can vary from a very fast to a very slow glide. It can be switched on or off using the **GLIDE** switch in the Voyager XL keyboard left-hand controller section, or in the PANEL mode menu of the RME. You can also turn glide on or off by sending a MIDI CC 65 message (0-63 = off, 64-127 = on).

Oscillator CV Inputs on the Patch Panel:

PITCH -
The **PITCH** jack allows you to connect an external CV or Expression Pedal to control the Voyager XL' s pitch. All three oscillators are effected by this connection. The effective input range is -5 to +5 V, where a positive CV will add to the Oscillator **FREQUENCY** control knob settings, and a negative CV will subtract from the settings. If an Expression Pedal is used, the pitch can only be made to increase, since the pedal connection supplies only a positive voltage.

WAVE -
The **WAVE** jack allows you to connect an external CV or Expression Pedal to control the oscillator wave-forms. All three oscillators are effected by this connection. The effective input range is 0 to +5 V; the result is dependant upon the panel **WAVE** control knob setting (a positive CV will add to the setting of the WAVE control knob).

C – The Filter Section

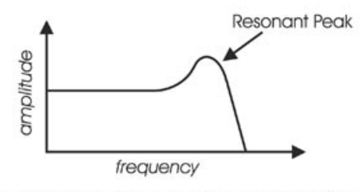
Filters are used to adjust the tone color of an audio signal. Filters modify sounds by rejecting some frequencies while allowing others to pass through. To understand the operation of filters and how they process sound, there are a few important terms to know.



The first term is 'Cutoff Frequency'. The cutoff frequency is the point at which an audio signal's frequencies begin to be rejected. Then there are the different types of filters; some of the most common and most musically useful filter types are 'lowpass', 'highpass', and 'bandpass'. A lowpass filter behaves as its name indicates; it passes all frequencies below the cutoff frequency and rejects frequencies above the cutoff. A highpass filter does the opposite. It passes all frequencies above the cutoff point and rejects the frequencies below the cutoff. A bandpass filter does a bit of both, since it is created by combining lowpass and highpass filters. In the case of a bandpass filter, the lowpass section defines the maximum frequency that will pass through, while the highpass section defines the minimum frequency that will pass through. What's left is a band of frequencies that will pass through the filters unaffected, hence the name, bandpass.

Another key term is the 'Cutoff Slope'. The cutoff slope determines the amount of attenuation that occurs above the cutoff frequency. The cutoff slope is specified in decibels per octave (commonly written as 'dB/oct'). The electrical design of a filter determines the cutoff slope. You may have heard the term 'pole' as it refers to filters. A pole is simply a design aspect of a filter, and each pole in a filter typically adds 6dB to the cutoff slope. This means that a one-pole filter has a cutoff slope of 6db/oct, a 2-pole filter has a 12dB/oct cutoff slope, etc. The classic Moog filter – the sound that started it all – is a 4-pole, 24dB/oct lowpass filter.

Another important filter term is 'Resonance'. Resonance refers to a peak that appears at the cutoff frequency. In synthesizers, this resonant peak is usually an adjustable parameter (called ' Resonance') that is part of the filter controls. High resonance values emphasize the overtones that fall within the frequency range of the resonant peak, giving the processed sound a character that can be described as vocal, quacky or zappy, depending on the source sound. When the resonance is turned up past about 8 on the dial, the filter begins to self-oscillate at the cutoff frequency, producing a sine wave tone. The Keyboard Control Amount control sets how much the filters' cutoff frequencies track the keyboard note that is played. As you play higher on the keyboard, the cutoff frequency goes higher, too.



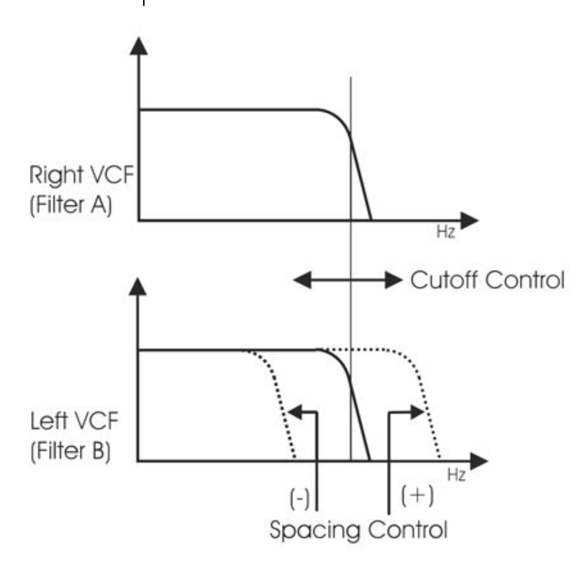
Frequency response of a Lowpass filter with Resonance



In the original Minimoog, the Resonance control was called 'Emphasis'. Many of the current Minimoog emulations (both hardware and software) use the term 'Emphasis' instead of 'Resonance' in the filter section to preserve the authentic vibe of the original hardware.

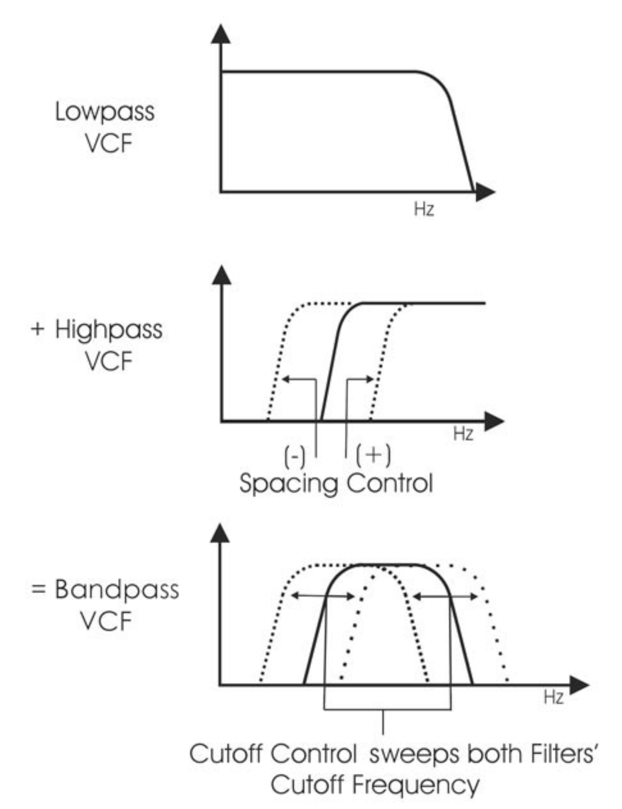
The Voyager XL has two voltage controlled filters (VCF's) that can be configured either as dual lowpass filters or as a combination of highpass & lowpass through a front panel switch. Additionally, the cutoff slope of each filter can be changed in software, resulting in a wide range of unique and interesting sounds.

Dual Lowpass Mode:



The Voyager XL Dual Lowpass filter mode features two lowpass filters which are routed to the left and right audio output, creating a stereo effect. The **CUTOFF** knob controls the frequency cutoff of both filters. The filters can be set to the same cutoff frequency, or adjusted to different cutoff frequencies using the **SPACING** control. When the two filters are set at different cutoff frequencies and routed to two different speakers, the resulting sound can vary from something simple (like a mild phaser effect) to sounding like two very different synths playing at the same time. In Dual Lowpass mode, the **RESONANCE** control affects both filters identically.

Highpass Lowpass Mode:



In Highpass/Lowpass mode, the Voyager XL filters are configured as a lowpass and highpass filter in series, resulting in a bandpass filter. The output of the bandpass filter is routed to both outputs. As with the Dual Lowpass mode, the **CUTOFF** control changes the cutoff frequency of both filters, and the **SPACING** control sets the frequency difference between the highpass filter and lowpass filter. The spacing between the two filters creates a variable passband. In this mode, the **RESONANCE** control affects only the lowpass filter, thus making for some distinctive and usual filter sounds.

Filter Section Controls:

Cutoff:
The **CUTOFF** knob is the main filter control. This sets the cutoff frequency of both of the filters in the both Dual Lowpass and Highpass/Lowpass mode.

In Dual Lowpass mode, the frequencies to the right (CW) of the indicator on the knob are the frequencies that are filtered out. The frequencies to the left (CCW) of the indicator are the frequencies that are allowed to pass through the filter. This is why as you turn the control clockwise the cutoff frequency becomes higher and the sound becomes brighter. Of course to hear the effect of a lowpass filter it helps to have a signal rich in harmonics which provides high frequencies to filter. A good example of a sound rich in harmonics is a sawtooth waveform.

In Highpass/ Lowpass mode, the combination of highpass and lowpass filters forms a bandpass filter. The **CUTOFF** control changes the center frequency of the passband.

Spacing:
The **SPACING** control is used to determine the difference between the cutoff frequencies of the two filters in both Dual Lowpass mode and Highpass/ Lowpass mode. The numbers on the legend around the knob refer to octaves. When the **SPACING** control is centered, the cutoff frequencies of the two filters are identical and the filter sounds like a classic Moog Filter. Setting the **SPACING** control to +1 in Dual Lowpass mode means that the right filter has a cutoff frequency equal to where the **CUTOFF** control knob is set, and the left frequency has a cutoff frequency that is one octave higher than the right filter. This means when the **CUTOFF** control is swept, two resonant peaks are heard, giving the filter a unique quality.

In Highpass/Lowpass mode, the **SPACING** control sets the difference between the cutoff frequencies by shifting the highpass filter's cutoff frequency up or down. When the **SPACING** control is fully clockwise, the cutoff frequencies of the two filters are the same, making for a very narrow bandpass filter.

Resonance:
The **RESONANCE** control causes feedback in the filter circuit that adds harmonic emphasis at the cutoff frequency. This control affects the lowpass filters in either filter mode, but not the highpass filter. When the **RESONANCE** control is all the way down, the lowpass filters act as a tone control, rolling off high end as the **CUTOFF** control is turned down. As the resonance increases, the filter begins to form a peak at the cutoff frequency. Harmonic content within the frequency range of this resonant peak is emphasized, and the sound takes on a vocal-like quality. As the **RESONANCE** control is turned up the peak increases in strength until the control is set to 8 or higher, when the filter begins to self-oscillate – creating sine waves with the same frequency as the cutoff frequency.

Keyboard Control Amount:
The **KEYBOARD CONTROL AMOUNT** knob allows the filter cutoff to follow the key played on the Voyager keyboard (or the keyboard controlling the Voyager RME). A higher key will cause a higher cutoff frequency. This allows a sound to retain its brightness as it is played higher on the keyboard.

Mode:
The filter **MODE** switch selects either the dual lowpass configuration (DUAL LP) or the highpass/lowpass configuration (HP/LP).

Filter CV Inputs on the Patch Panel:

CUTOFF -

The **CUTOFF** jack allows you to connect an external CV or expression pedal to control the filter cutoff frequency. Both filters are effected by this connection, regardless of the filter mode setting. The effective input range is -5 to +5 V, where a positive CV will add to the filter cutoff knob setting, and a negative CV will subtract from the setting. Note that if an Expression Pedal is plugged into this jack, the cutoff can only be made to increase from the cutoff dial setting since the pedal connection supplies only a positive voltage.



Although CV Inputs for Filter Spacing and Resonance are not available on the Patch Panel, there are ways to externally control these parameters. Filter Spacing can be selected as a Programmable Modulation Destination in either Mod Bus, thus you could route the MOD2 input to control Filter Spacing through the Mod Busses. Also, MOD1 or MOD 2 inputs may be routed using the POT MAPPING feature to control any of the front panel knob functions, including Filter Spacing or Resonance.

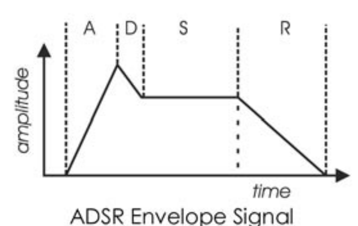
D. The Envelopes Section

Musical sounds have a start, middle and an end. For example, a plucked string sound starts with an initial burst of energy and then slowly fades out until it is silent. In synthesis terms, this progression is called an envelope – a shape that defines the changes that occur in a sound over time. An envelope can define any aspect of change in a sound – volume, timbre, or pitch. The circuits that create envelope control signals in synthesizers are called Envelope Generators (EGs).



When triggered, EG's produce a time-varying control voltage that has a specific start, middle and end profile. The parameters that define this CV profile are Attack, Decay, Sustain and Release, sometimes abbreviated as ADSR.

Attack determines the character of the onset of the sound. The EG's **ATTACK** knob controls this parameter by adjusting the time it takes for the envelope to go from zero to full value (in other words, the fade-in time). The **DECAY** control adjusts the second stage in the envelope's evolution by determining the time that it takes for the signal to drop from the full level to the level set by the **SUSTAIN** control. The envelope will remain at the Sustain level as long as an envelope gate signal is present (i.e. a key is held down). When the gate signal is released, the **RELEASE** control determines the time it takes for the envelope to transition from the Sustain level to zero (see the ADSR Envelope Signal figure).



ADSR Envelope Signal

The Voyager XL has two identical EG circuits; one EG is dedicated to the filter (to control the cutoff frequency), and one is EG dedicated to the amplifier (to control the volume). Both EG's can also be used as a modulation sources or modulation shaping through the Modulation Busses, and both EG's are available as individual CV Outputs on the Patch Panel.

Envelope Section Controls:

Attack:
The **ATTACK** control sets the attack time of the corresponding envelope generator, from 1 msec to 10 seconds.

Decay:
The **DECAY** control sets the decay time of the corresponding envelope generator, from 1 msec to 10 seconds.

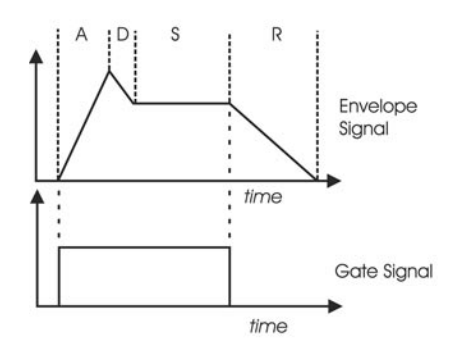
Sustain:
The **SUSTAIN** control sets the corresponding level for the sustained part of the envelope.

Release:
The **RELEASE** control sets the release time of the corresponding envelope (the time for the envelope to transition from the sustain level to zero), from 1 msec to 10 seconds.

Amount To Filter:
For the filter envelope, there is an **AMOUNT TO FILTER** control that adjusts the amount that the filter envelope signal modulates the filter. The **AMOUNT TO FILTER** control has both positive and negative values. If it is set to a positive value (say '+2'), the envelope will add to the **CUTOFF** control setting. If it is a negative value (say '–2'), the envelope will subtract from the **CUTOFF** control setting.

Envelope Gate:
The envelopes are triggered by a gate signal. The envelopes will sustain as long as a gate signal is present. When the gate is off, the Release portion of the envelope is executed as shown below. The switch labeled **KEYB/ ON/EXT** selects whether the envelopes are triggered from the keyboard, or from a programmable gate source. When **KEYB** (Keyboard) triggering is selected, the envelopes are triggered by a MIDI Note On. When the switch is set for **ON/EXT** (On/External), the envelope gate sources are set by the programmable gate sources in EDIT mode, called 'Fil. ENV Gate SRC' (Filter Envelope Gate Source) and 'Vol. ENV Gate SRC' (Volume Envelope Gate Source). The default for the programmable gate sources is 'Env Gate Input' which defaults to ON. In this case the envelopes sustain at the level determined by the respective envelope **SUSTAIN** controls. This is useful for keeping the envelopes sustaining without holding a key down, when you want to process an external audio signal through the filters with out using the keyboard, or to create drones. This also allows separate gate sources for the two envelopes.

Envelopes sustain as long as a Gate Trigger is present. The Release phase starts when the Gate Trigger stops.



Related Controls:

Release Switch:
The release time of the envelopes is set by their respective **RELEASE** control knob, but this control knob can also be switched OFF using the **RELEASE** switch located on the left-hand control panel.



NOTES:
1. The Release function is actually a divider for the release time, so if the RELEASE control knob is set to 10, the release of the envelopes will not be absolutely abrupt with the RELEASE ON/OFF function switched off.

2. The RELEASE function can also be remotely controlled by sending MIDI CC message 64 with the following values:
0-63 = OFF
64-127 = ON

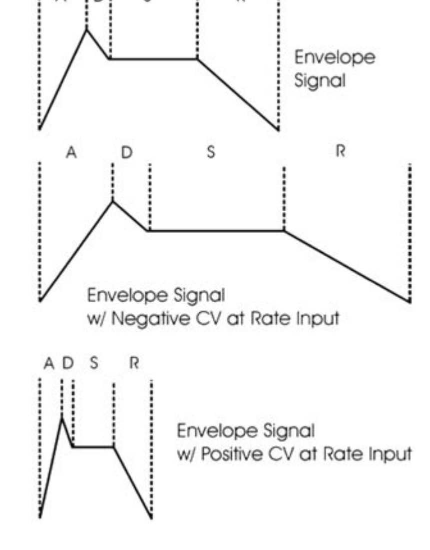
Envelope CV Inputs on the Patch Panel:

GATE (Envelope Gate Input)
The **GATE** jack allows you to connect a footswitch or input a CV gate signal to remotely trigger both Envelope Generators. This input triggers the EG's only when the front panel **ENV GATE** switch is set to 'ON/EXT'. If the **ENV GATE** switch is set to 'KEYB', any input on the **GATE** jack will be ignored.

RELEASE
The **RELEASE** jack allows you to connect a footswitch or input a CV gate signal. Pressing the footswitch or applying a gate signal (+5V) enables the Release phase of both Envelope Generators regardless of the setting of the **RELEASE** switch.

RATE (Rate Control Input)
The **RATE** jack is a CV input for external control of the Voyager's envelope time constants, using either a CV or expression pedal. The effective input range is -5V to +5V and effects both envelopes. A positive voltage applied to the **RATE** jack will *decrease* the attack, decay and release times from the envelope panel knob settings, and a negative voltage will *increase* the attack, decay and release times from the panel knob settings as shown.

The envelope AD&R parameters will expand and contract based on the voltage at the RATE jack.



E. The Output Section

The Voyager XL has two audio outputs. There is a Voltage Controlled Amplifier (VCA) for each output, which allows for stereo functions such as panning or the dual lowpass filtering. The main control for the volume is the Master Volume control. The Volume Envelope modulates the output VCAs.



Output Section controls:

Master Volume:
The **MASTER VOLUME** knob is the main volume control. Full-clockwise is maximum output, full-counterclockwise silences the Voyager XL.

Headphone Volume:
This **HEADPHONE VOLUME** knob controls the volume that appears on the **HEADPHONE OUTPUT** jack. Full-clockwise is maximum output, full-counterclockwise silences the Voyager XL.

Headphone Output:
The **HEADPHONE OUTPUT** connection is a ¼" TRS jack that outputs the audio signal to a pair of stereo headphones.

VCA Inputs on the Patch Panel:

VOLUME -
The **VOLUME** jack allows you to connect an external CV or expression pedal to control the output volume. Both VCA's are effected by this connection. The effective input range is 0 to +5 V, where 0V = Volume OFF, and +5V = Full Volume.

PAN -
The **PAN** jack allows you to connect an external CV or expression pedal to control panning between the right and left outputs. A CV of 5 Volts will control the full panning range, where:
-2.5V = Fully Left
+2.5V = Fully Right

If an expression pedal is plugged into the **PAN** jack, the pedal will reach its full positive effect over just half of its useful travel, since it gets +5V from the **PAN** jack. Note also that you will not be able to pan left with the pedal without additional offset programming because the Expression Pedal voltage does not go below 0V.

F – The Modulation Buss Section

Modulation is the heart of making interesting sounds with analog subtractive synthesis. The Voyager XL's two Modulation Busses open up a world of modulation possibilities.



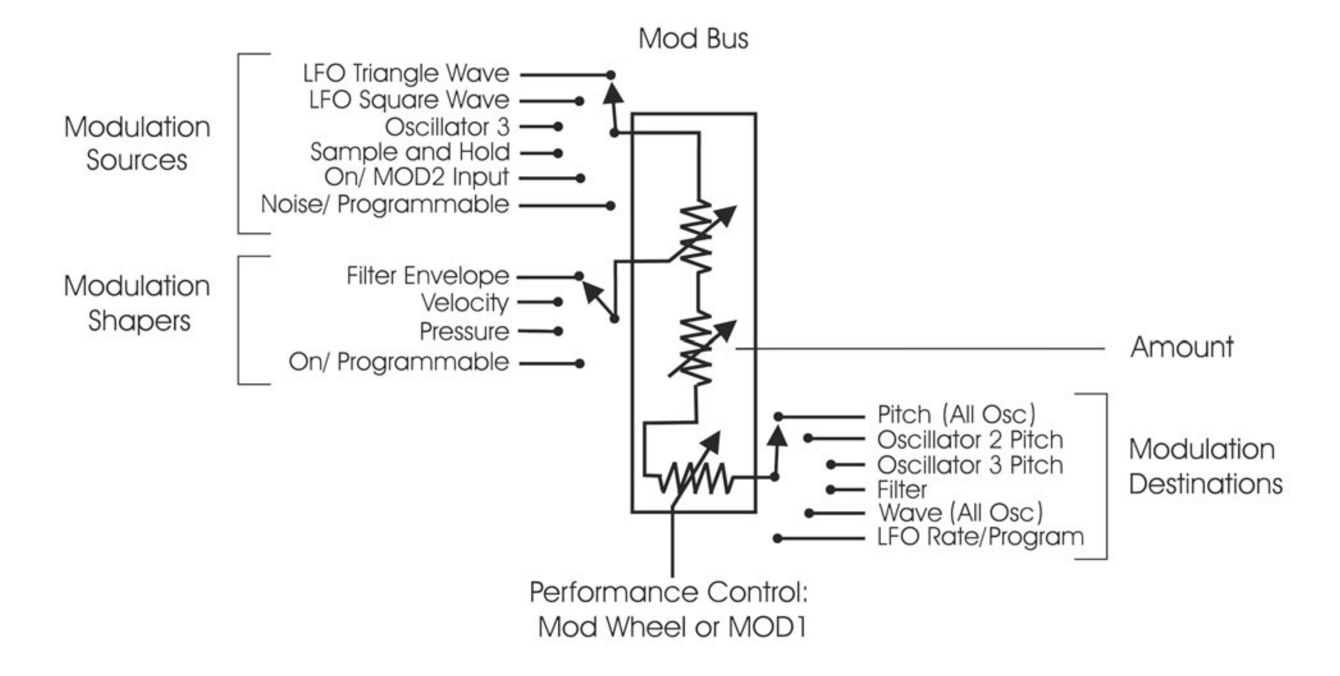
The Modulation Busses allow you to select a variety of modulation sources, destinations, modulation shaping, and amounts. The two Mod Busses are labeled MOD WHEEL and PEDAL/ON. The performance control for the MOD WHEEL Buss is the Modulation Wheel itself, while the performance control for the PEDAL/ON Buss is the MOD 1 Input jack on the Patch Panel.



NOTE: The MOD 1 parameter is also addressable through a MIDI CC2 message or through the EDIT Mode 'Pot Mapping' function.

The MOD 1 input can accept an Expression Pedal like the EP-2, and is used like the Modulation Wheel to fade in and fade out the desired modulation. With nothing plugged into the MOD 1 input, the AMOUNT control of the PEDAL/ON buss sets the modulation amount.

The diagram below shows the configuration of a single Mod Buss, but the controls for both busses are the same.



Three controls modify the amount of modulation: the **AMOUNT** control, the **SHAPING** control, and the Mod Wheel (for the Mod Wheel Mod Buss) or MOD1 level (for the Pedal/On Mod Buss). The **AMOUNT** control sets how much both the Mod Wheel/MOD1 Input and the Shaping CV allow the mod source through to the mod destination.

To try out a simple modulation effect, make the following settings on the MOD WHEEL Buss:

- Set the **LFO RATE** control to about 6 Hz
- Set the **SOURCE** control to the Triangle wave
- Set the **SHAPING** control to ON/PGM
- Set the **DESTINATION** control to PITCH
- Set the **AMOUNT** control to 5

These settings allow the Mod Wheel performance control to be used to fade in the modulation, which should sound something like vibrato. This is a simple use of a Mod Buss. The flexibility of the two Modulation Busses offer a wealth of modulation possibilities which make the Voyager an incredible sound design tool.

Modulation Buss Section Controls:

Source:
The **SOURCE** control selects the source of the modulation. The modulation source is actually chosen through a combination of the **SOURCE** control and software modulation options. The Source selections are:

- /\/\ (the LFO Triangle wave)
- ⎍⎍ (the LFO Square wave)
- OSC 3 (Oscillator 3)
- S+H (the LFO Sample and Hold output)
- ON/MOD2: If nothing is plugged into the MOD2 jack, this selection is ON, but it can also be addressed either through the EDIT Mode function 'Pot Mapping', or MIDI CC 4.
- NOISE/PGM: This is a programmable source for the mod bus. Noise is the default. The programmable modulation sources are set in the EDIT mode menu functions 'MOD WHEEL PGM SOURCE' or 'PEDAL PGM SOURCE'.

Shaping:
The **SHAPING** control selects the modulation shaping options. Shaping is a way to dynamically change the amount of modulation . The Shaping selections are:

- FILT ENV: This allows the Filter Envelope to shape the amount of Modulation before the Mod Wheel or MOD1.
- VELOCITY: This allows Keyboard Velocity to shape the amount of Modulation before the Mod Wheel or MOD1.
- PRESSURE: This allows Keyboard Aftertouch (Pressure) to shape the amount of Modulation before the Mod Wheel or MOD1.
- ON/PGM: This is a programmable shaping option for the mod bus; ON is the default. Both Mod Busses share two programmable Shaping Sources that are summed together. These sources are available in the EDIT mode as 'PGM Shaping 1 SRC' and 'PGM Shaping 2 SRC'.

Destination:
The **DESTINATION** control selects the destination of the modulation. The modulation destination is chosen in the same manner as the source. The modulation destination selections are:

- PITCH (the pitch of all three oscillators)
- OSC2 (the pitch of Oscillator 2 only)
- OSC3 (the pitch of Oscillator 3 only)
- FILTER (the Cutoff Frequency of the filter)
- WAVE (the waveforms of all 3 oscillators)
- LFO/PGM: This is a programmable destination for the Mod Bus; LFO Rate is the default. Programmable Mod destinations are set in the EDIT mode using the menu functions 'PGM M-WHL DEST' (Programmable Mod Wheel Destination) and 'PGM PEDAL DEST' (Programmable Pedal Destination).

Amount:
The **AMOUNT** control is used to set the maximum amount of modulation that is sent to the modulation destination. When the **AMOUNT** control is set to 0, no modulation will pass. When the **AMOUNT** is set to 10, the maximum amount of modulation is sent to the destination when the performance controller (Mod Wheel or MOD1 level) is all the way up.

Related Controls:

Mod Bus Performance Controllers:
The Mod Wheel and MOD 1 Input are performance controllers for the Mod Wheel Modulation Bus and Pedal/ON bus respectively. These performance controllers are the final stage in determining the amount of modulation sent to the selected destination. When these controllers are set to maximum, the modulation amount is determined by the AMOUNT control. When these controllers are set to 0, the modulation amount is 0.

Modulation Bus CV Inputs on the Patch Panel:

MOD 1:
The **MOD 1** jack accepts an Expression Pedal or control voltage from 0 to 5 Volts. This input is used as the performance control for the PEDAL/ON Mod Bus. With nothing plugged into this jack, the voltage here is 5V (the 'ON' state). With an input applied, when the voltage is at 0, no modulation is sent to the PEDAL/ON Modulation Destination. When the Voltage at the MOD1 is at 5 Volts, the Modulation is sent to the destination at the level set by the PEDAL/ON **AMOUNT** control.

MOD 2:
The **MOD 2** jack allows you to apply an external modulation source into the MOD busses. The input accepts an Expression Pedal or a control voltage from 0 to +5 Volts. With nothing plugged into this jack, the voltage here is 5 V (the 'ON' state). When the **SOURCE** control is set to 'ON/MOD2', the voltage applied to this jack becomes the Modulation Source.

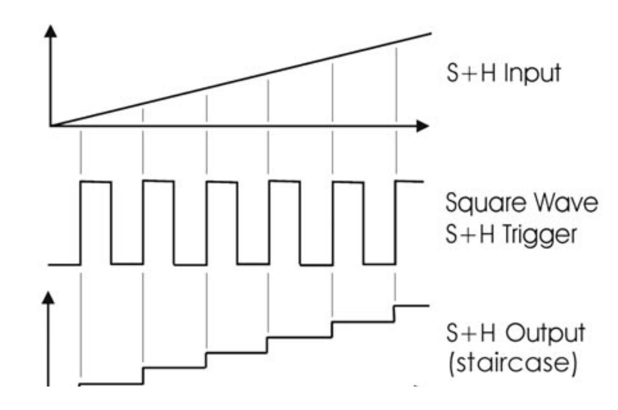
G – Primary LFO/Sample and Hold Section

The Primary LFO provides both Low Frequency Oscillator and Sample & Hold (S+H) modulation sources for the Voyager XL Modulation Busses. The LFO provides triangle and square waves, while the S+H produces a random voltage output. The LFO Frequency and S+H Rate are both controlled by the **LFO RATE** knob, which is adjustable from 0.2 to 50 Hz. The LFO and S+H outputs are selectable as separate modulation sources in both Modulation Busses.



To generate the S+H function, the LFO's square wave is used as the S+H Trigger, while the Voyager XL Noise source is used for the S+H Input signal. For each positive-going cycle of the LFO square wave, the voltage at the input of the S+H circuit is sampled and held until the next cycle. Since the sample source is Noise (a random signal), the voltage that appears at the output of the S+H circuit is a random voltage that changes in time with the LFO.

Inputs on the Modular Patch Panel allow additional flexibility with the Sample and Hold circuit. For example, if a plug is inserted into the S+H Gate input, it will disconnect the LFO trigger; an external gate signal can then be used to trigger the S+H circuit. Similarly, a plug inserted into the S+H Input jack disconnects the Noise source from the S+H input. In this circumstance when the S+H circuit is triggered, the voltage at the tip of the plug is held at the output of the S+H circuit. This makes it possible to get "staircase" modulation patterns as shown below.



The Voyager XL Sample and Hold circuit can create more than just random signals – interesting stepped modulation patterns are also possible.

LFO/Sample and Hold Section Controls

LFO Rate:
The **LFO RATE** control sets the frequency of the LFO. The controllable range is 0.2 to 50 Hz.

LFO Sync:
The **LFO SYNC** control selects the trigger method for starting the LFO waveform. There are four trigger modes:

- OFF/SYNC: This setting allows the LFO to be free running unless there is a connection to the LFO SYNC input (see below).
- MIDI: This setting allows the division of the MIDI clock signal (set up in the EDIT mode function 'MIDI CLK Divider') to retrigger the LFO. Note that the LFO is an analog circuit, and does not automatically sync to MIDI clock; it is restarted much in the manner of oscillator sync, and does not defeat the Rate control.
- KB (Keyboard): This setting allows the LFO to be retriggered when a MIDI 'Note On' message is received.
- ENV. GATE: This setting allows an input to the Envelope Gate Source jack (part of the Envelope CV inputs) to restart the LFO.

LFO CV Inputs on the Patch Panel:

LFO RATE -
The **LFO RATE** jack accepts an Expression Pedal or a control voltage from -5 to +5V. A positive voltage here adds to the position of the **LFO RATE** control knob, while a negative voltage will subtract from it.



By applying an external voltage to the LFO RATE jack you can control the LFO frequency well beyond the specified range. Rates lower than one cycle per minute are possible, as are frequencies that go well into the audio range.

LFO SYNC -
The **LFO SYNC** jack accepts a footswitch or a +5V Gate input. Closing the footswitch or applying a gate here will retrigger the LFO waveform.

S&H IN (Sample and Hold Input) -
The **S&H IN** jack accepts an expression pedal or a control voltage from -5 to +5V. The voltage on this jack is the signal source for the Sample and Hold circuit input.

S&H GATE (Sample and Hold Gate) -
The **S&H GATE** jack accepts a +5V Gate input. Applying a gate signal here will trigger the Sample and Hold circuit.



The S&H GATE jack will only work with a +5V Gate input, not a footswitch.

H – Keyboard and Left-Hand Controllers



The Voyager XL has a 61 note velocity sensitive keyboard (5 octaves, C to C). When combined with the ±2 octave transpose feature (accessed by double-pressing the **EDIT** button) the actual playable range is a full 9 octaves. Also, the Voyager's keyboard transmits MIDI Note On and Note Off messages polyphonically, and produces velocity control and aftertouch (pressure) voltages monophonically. To the left of the keyboard is the Left Hand Controller Panel, which contains the Pitch Bend and Mod Wheel performance controls, and the Glide and Release switches.

Pitch Bend Wheel:
This spring-loaded control affects the pitch of all oscillators. The amount of pitch bend can be set for each direction (UP/DOWN) independently for each preset.

Modulation Wheel:
This control sets the amount of modulation that is sent to the modulation destination of the Mod Wheel Bus. Each preset has the Modulation Wheel programmed to introduce some additional dimension to the sound. As you explore the presets, don't forget to try the Modulation Wheel to hear this added effect on the sound.

Glide:
The **GLIDE** switch turns the Glide function ON and OFF. The glide rate is controlled by the GLIDE RATE panel control

Release:
The **RELEASE** switch is used to shorten the release time of both the Filter and Volume envelopes. You will notice that with very long release times, the release time will be shortened when the RELEASE switch is engaged, but not off all the way.

Keyboard and Left-Hand Controller CV Outputs on the Patch Panel:

PITCH -
The signal on the **PITCH** jack is the control voltage of the last note played on the keyboard. It is the same voltage used for controlling the pitch of the Voyager's Voltage Controlled Oscillators.

VEL (Velocity) -
The signal on the **VEL** jack is the control voltage value of the velocity when a key is pressed (-5V to +5V).

PRESS (Pressure) -
The signal on the **PRESS** jack is the equivalent control voltage value of the pressure exerted on a key after it is pressed (-5V to + 5 V).

GATE -
The signal on the **GATE** jack is the gate trigger signal that is generated when a key is pressed (+5V ON, 0V OFF)

I – Ribbon Controller



The 500mm Ribbon Controller is located on the middle wooden rail of the Voyager XL. The Ribbon's center point is lined up with 'Middle-C' on the 61-note keyboard. The Ribbon can be used to impart complex gestures to a given sound by touching the ribbon, by moving a finger around on it or by tapping it. Unlike the other real-time performance controllers on the Voyager XL, however, the Ribbon Controller isn't 'hardwired' to control one specific parameter; instead, it must be physically connected on the Modular Patch Panel to have an effect on the sound. This arrangement gives the Ribbon Controller the ability to control any single parameter or a group of Voyager XL parameters, and can also be used to control our Moogerfooger® line of analog effects and other CV-compatible equipment.

Functionally, finger movements to the right of the Ribbon's center point will cause the CV output to increase, while finger movements to the left of the center will cause the CV output to decrease. The Ribbon Controller output is sampled and is available as CV-OUT and GATE OUT on the Patch Panel.

Ribbon Controller CV Outputs on the Patch Panel:

CV OUT -
The signal on the Ribbon **CV OUT** jack is the control voltage of the last fingered ribbon position (-5V to +5V). The Ribbon voltage is also the default output of the ATTENUATOR CH 2 module on the Patch Panel (if nothing is plugged into ATTENUATOR CH 2, the output is the Ribbon CV).

GATE OUT -
The **GATE OUT** jack provides a gate trigger signal that is generated whenever finger pressure is applied to the ribbon controller (+5V ON, 0V OFF).



A common use of the Ribbon Controller is to control pitch, but the Patch Panel offers many other interesting routing possibilities for the Ribbon. For example, you can create finger-controlled Timbre Modulation by patching the Ribbon GATE OUT through an ATTENUATOR to the Filter CUTOFF. Adjust the Attenuator AMOUNT knob as you tap anywhere on the Ribbon to select the desired amount of effect. This type of effect works best with presets that have a moderate Filter Cutoff setting.

J – Touch Surface Controller



The Touch Surface Controller is a real-time, three-dimensional control surface. It can be used to impart complex gestures to the sound of the Voyager by touching it, by moving a finger around on it or by tapping it. A finger movement from left to right controls the X-axis, an up and down movement controls the Y-axis, and the amount of the Touch Surface that is covered by the finger controls the Area. Additionally, when the Surface is touched a Gate signal is generated, providing a total of four individual control signals (X,Y, A and Gate) that can be routed to a number of the Voyager's parameters.

The control signals generated by the Touch Surface Controller can be internally routed two ways:

- Destinations can be programmed using the 'Touch Surface Destinations' selection in the EDIT mode menus. There are 32 possible destinations that can be selected for each axis (X,Y A) and 14 possible destinations for the Gate. These configurations are saved individually per Preset.
- The Touch Surface X and Y axes can be selected as Programmable Mod Buss Sources using the EDIT mode menus 'PGM Mod Whl Source' and 'PGM Pedal Source'

Details on programming Touch Surface Controller destinations are covered in the EDIT Mode section.

Touch Surface CV Outputs on the Patch Panel:

X,Y -
The signals on the **X** and **Y** jacks is the control voltage generated by the position of horizontal and vertical contact with the Touch Surface (-5V to +5V).

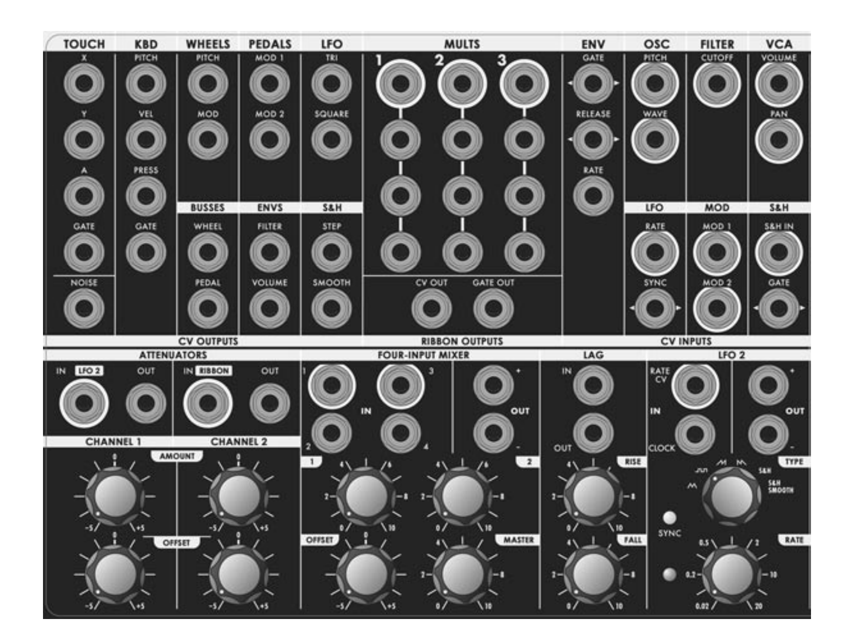
A -
The signal on the **A** jack is the control voltage generated by the amount of area covered on the Touch Surface (-5V to +5V).

GATE -
The signal on the **GATE** jack is the gate trigger signal that is generated whenever finger pressure is applied to the Touch Surface (+5V ON, 0V OFF).



There is no right or wrong way to use the Touch Surface Controller; experimentation is the key. It is an exciting way to explore synthesis performance – with 3 control signals generated from a single finger in contact with the Touch Surface, it is like turning three knobs at the same time – giving you the capability to "morph" sounds in a variety of ways.

K – Modular Patch Panel



Located on the far left of the Voyager XL , the Modular Patch Panel is the functional equivalent of what you might find on a modular synthesizer, with patch points conveniently grouped to keep all the related input and output functions neatly together. The upper panel features jacks for specific Voyager XL CV inputs and outputs, while the lower panel provides general CV processing functions. Together, the two sections provide a wealth of CV real-time performance options that allow you to treat the Voyager XL just like a modular synth.

UPPER PANEL TOUR:
From right to left, the CV OUTPUT section provides 20 Control Voltage and Gate outputs generated by the Voyager XL components. Next to that is the MULT (Multiple) section that provides three 4-way multiples. Each 4-way Mult is powered, meaning that the top-most jack (the jack with the white ring) will power a standard Expression Pedal like the Moog EP-2. Directly beneath the MULT section are the Ribbon Controller CV and GATE output jacks. To the right of that is the CV INPUT section that provides 14 Control Voltage and Gate inputs to the Voyager XL.

LOWER PANEL TOUR:
From right to left, the ATTENATORS section provides 2 Attenuators with AMOUNT and OFFSET controls. Next to that is a FOUR-INPUT MIXER that provides four CV inputs (two powered/two unpowered) with normal and inverted outputs. To the right of that is the LAG PROCESSOR, which provides controls for slowing down rapidly changing waveforms. Next to that is LFO 2, which provides a secondary LFO function featuring a selection of waveforms, adjustable rate control, normal and inverted outputs, and expanded operation via MIDI.



Two important principles to keep in mind as you create routings with the Patch Panel:

1. A *source* (output) always goes to a *destination* (input).
2. The MULT should not be used as a mixer - never apply more than one CV source (output) to a Mult. Combining two or more CV's in a Mult can cause them to add together in a way that can be damaging! If you wish to combine several CV's, use the CV Mixer.

Patch Panel CV Outputs - Description

The following is a functional description of the Patch Panel CV Output jacks:

TOUCH
This group of outputs is generated from the Voyager keyboard's Touch Surface Controller. There are three control voltages (X, Y, and A) and one gate signal.

X: This is the CV generated by left to right (horizontal) position of contact with the touch surface.
Y: This is the CV generated by up and down (vertical) position of contact with the touch surface.
A: This is the CV generated by the amount of area covered on the touch surface.
GATE: This is a gate signal generated by contact with the touch surface. When contact is made, the Gate is ON and when no contact is made the Gate goes OFF.

NOISE
This output is the Voyager XL's internal noise source.

KBD
This group of outputs is generated from the Voyager XL Keyboard. There are three control voltages (Pitch, Velocity and Pressure) and a Gate signal.

PITCH: This is the CV generated by the note played on the keyboard. It is the same voltage used for controlling the pitch of the Voyager XL Voltage Controlled Oscillators.
VEL: This is the CV determined by the velocity used to depress a key.
PRESS: This is the CV determined by how much pressure is exerted on a key after it is depressed.
GATE: This is the gate trigger signal that is generated when a key is pressed.

WHEELS
This group of outputs is generated from the Voyager XL Left Hand Controller Wheels.

PITCH: This is the CV generated from the Pitch Wheel.
MOD: This is the CV generated from the Mod Wheel.

PEDALS
This group of outputs is generated from the MOD1 and MOD2 jacks on the rear panel of the Voyager.

MOD1: This is the CV generated from the MOD1 input. The MOD1 Input is a CV input on the Voyager that determines how much of the PEDAL/ON Mod Bus Source goes to the PEDAL/ON Mod Bus Destination. With nothing plugged into the MOD1 jack, the voltage that's present at the MOD1 jack is +5V. When a CV is plugged in to the MOD1 input, that voltage replaces the +5 Volt signal at the MOD1Input. The voltage applied to the MOD1 Input is transformed into a bi-directional signal (-5V to + 5V) at the MOD1 output.
MOD2: This is the CV generated from the MOD2 input. The MOD2 Input is a CV input on the Voyager that is an external modulation source for the Mod Busses. With nothing plugged into the MOD2 jack, the voltage that's present at the MOD2 jack is +5V. When a CV is plugged in to the MOD2 input, that voltage replaces the +5 Volt signal at the MOD2 Input. The voltage applied to the MOD2 Input is transformed into a bi-directional signal (-5V to + 5V) at the MOD2 output.

LFO
This group of outputs is generated from the Voyager's Primary LFO. There are two CV waveforms available here (triangle and square) and both can be used at the same time

TRIANGLE: This is the triangle wave output of the LFO.
SQUARE: This is the square wave output of the LFO.

BUSSES:
This group of outputs is generated by the Mod Buss signals. They are the Modulation source after being shaped by the SHAPING signal at the level determined by the AMOUNT control and the MOD WHEEL or signal at the MOD1 Input jack

WHEEL: This is the output of the Mod Wheel Mod Buss. It is the Mod Wheel SOURCE shaped by the SHAPING signal. The level is determined by the **AMOUNT** control and the MOD WHEEL.
PEDAL: This is the output of the Pedal/On Mod Buss. It is the Pedal/On SOURCE shaped by the SHAPING signal. The level is determined by the **AMOUNT** control and the signal at the MOD1 Input jack.

ENVS
This group of outputs is the output of the Envelope Generators.

FILTER: This is the CV output of the Filter Envelope Generator.
VOLUME: This is the CV output of the Volume Envelope Generator.

S & H
This group of outputs is generated by the Sample and Hold Circuit.

STEP: This is the output of the Sample and Hold Circuit.
SMOOTH: This is the Smoothed output of the Sample and Hold Circuit.

MULT
The Patch Panel features three 4-way Mults (Multiples). A mult is used to distribute a single source (output) to multiple destinations. An example is connecting the Voyager XL Primary LFO to the Volume, Filter and Pan Control Inputs. In this case, all three of those parameters will be controlled simultaneously by the LFO.

The table below shows the effective ranges of the Voyager XL CV Outputs.

SECTION	PARAMETER	EFFECTIVE RANGE
TOUCH	X	-5 to + 5V
	Y	-5 to + 5V
	A	-5 to + 5V
	GATE	+5V ON, 0V OFF
KBD	PITCH (Note 1)	-0.916V to 2.667V Nominal
	VEL	-5 to + 5V
	PRESS	-5 to + 5V
	GATE	+5V ON, 0V OFF
WHEELS	PITCH	-5 to +5V
	MOD	-5 to +5V
PEDALS	MOD1 (Note 2)	-5 to +5V
	MOD2 (Note 2)	-5 to +5V
LFO	TRIANGLE	+/- 2.5 V
	SQUARE	0 to +3V
BUSSES	WHEEL	-4 to +4V Nominal
	PEDAL	-4 to +4V Nominal
ENVS	FILTER	0 - 5V
	VOLUME	0 - 5V
S&H	STEP	-2 to +2V Nominal
	SMOOTH	-2 to +2V Nominal
Noise	Noise	+/- 1V Nominal

Voyager XL CV Outputs

Note 1: The voltages shown are the Keyboard Pitch voltage range when the Voyager XL keyboard is played. The range will be different when MIDI Note-On messages are received. The Keyboard Pitch voltage output changes by 1 volt per octave (internally adjustable).

Note 2: The MOD1 and MOD2 outputs default to +5V if nothing is connected to the MOD1 and MOD2 inputs.

Patch Panel CV Inputs - Description

The following is a functional description of the Modular Patch Panel CV Inputs. Jacks with white rings indicate inputs that can accept either a CV or an Expression Pedal. Jacks with left/right arrows indicate inputs that can accept either a CV Gate input or a footswitch.

ENV

This group of inputs allows you to apply an external signal to control the Envelope parameters for Rate, Release and Gate. Both Envelopes (Filter and Volume) are affected.

GATE: This input allows you to connect a footswitch or input a CV gate signal to remotely trigger both Envelope Generators. This input triggers the EG's only when the front panel ENV GATE switch is set to 'ON/EXT'. If the ENV GATE switch is set to 'KEYB', an input on the GATE jack is ignored.

RELEASE: This input allows you to connect a footswitch or input a CV gate signal. Pressing the footswitch or applying a gate signal (+5V) enables the Release phase of both Envelope Generators regardless of the setting of the software RELEASE function.

RATE: This input allows you to control of the Voyager's envelope time constants with either a CV or expression pedal. A positive CV will *decrease* the attack, decay and release times from the envelope panel knob settings, and a negative voltage will *increase* the attack, decay and release times from the panel knob settings.

OSC

This group of inputs allows you to connect an external CV or Expression Pedal to control the Voyager XL Pitch and Wave parameters

PITCH: This input affects the pitch all three oscillators. A positive CV will add to the oscillator dial settings, and a negative CV will subtract from the settings.

WAVE: This input affects the waveform of all three oscillators. A positive CV will add to the wave dial settings.

FILTER

This input allows you to connect an external CV or Expression Pedal to control the Voyager's Filter Cutoff parameter

CUTOFF: This input affects the frequency cutoff of both filters. A positive CV will add to the cutoff dial setting, while a negative CV will subtract from the setting.

VCA

This group of inputs allows you to connect an external CV or Expression Pedal to control the Voyager XL Volume and Pan parameters.

VOLUME: This input affects the volume of both VCA's. The Voyager's **MASTER VOLUME** control sets the absolute maximum value. A positive CV will then adjust the volume up or down within the range set by the **MASTER VOLUME** control.

PAN: This input affects the panning between the left and right outputs. A positive control voltage will pan right while a negative voltage will pan left.

LFO

This group of inputs allow you to connect an external signal to control the Voyager's LFO Rate and Sync parameters.

RATE: This input affects the LFO Rate. The LFO RATE jack accepts an expression pedal or a CV. A positive CV adds to the position of the **LFO RATE** control, while a negative voltage subtracts from the position of the **LFO RATE** control.

SYNC: This input affects the synchronization of the Voyager's LFO. The LFO SYNC jack accepts a footswitch or a +5V Gate input. Closing the footswitch or applying a gate retriggers the LFO waveform.

MOD

This group of inputs allows you apply external modulation sources (MOD 2) and modulation control (MOD 1) to the Mod Busses.

MOD 1: The MOD 1 jack accepts an expression pedal or control voltage from 0 to 5 Volts. This input is used as the performance control for the PEDAL/ON Mod Bus. With nothing plugged into this jack, the voltage here is 5V (the 'ON' state). With an input applied, when the voltage is at 0, no modulation is sent to the PEDAL/ON Modulation Destination. When the Voltage at the MOD1 is at 5 Volts, the Modulation is sent to the destination at the level set by the PEDAL/ON AMOUNT control.

MOD 2: The MOD 2 jack allows you to apply an external modulation source into the modulation busses. The input accepts an expression pedal or a control voltage of 0 to +5V. With nothing plugged into this jack, the voltage here is 5 V (the 'ON' state). When the **SOURCE** panel control of either Modulation Bus is set to 'ON/MOD2', the voltage applied to this jack becomes the modulation source.

S & H IN

This group of inputs allow you to connect external signals to control the Voyager XL Sample and Hold Circuit.

S&H IN : This is the input to the Voyager's Sample and Hold circuit. This jack accepts an Expression Pedal or a control voltage from -5 to +5V.

GATE: This input accepts a +5V gate input only.

The table below shows the effective ranges of the Voyager XL CV outputs. All non-gate inputs supply power, allowing you to connect either an Expression Pedal or a control voltage to these jacks.

SECTION	PARAMETER	EFFECTIVE RANGE	JACK SUPPLIES POWER
ENV	RATE	-5 to +5V	Y
	RELEASE	+5V ON, 0V OFF	N
	GATE	+5V ON, 0V OFF	N
KBD	PITCH	-5 to +5V	Y
	WAVE (Note 1)	-5 to +5V	Y
FILTER	CUTOFF	-5 to +5V	Y
VCA	VOL	0 to +5V	Y
	PAN (Note 2)	-2.5 to +2.5V	Y
LFO	RATE	-5 to +5V	Y
	SYNC	+5V ON, 0V OFF	N
MOD	MOD1	0 to +5V	Y
	MOD2	0 to +5V	Y
S&H	S&H IN	-5 to +5V	Y
	GATE (Note 3)	+5V ON, 0V OFF	N

Voyager XL CV Inputs

Note 1: All three oscillators are effected by the WAVE input, and voltage applied to this input adds to or subtracts from the oscillator WAVE knob settings. Although the WAVE jack will accept a -5V to +5V input, it only takes a 5V control range to sweep through all the waveforms from Triangle to Pulse. This means if the oscillator WAVE knob is set at 12 o'clock, the CV input on the WAVE jack would need to sweep -2.5V to +2.5v to get all the waveforms possible.

Note 2: The voltage range shown covers the complete panning range from Full Left (-2.5V) to full Right (+2.5V).

Note 3: All GATE inputs will accept a footswitch except for the S&H GATE. A footswitch will have no effect on the S&H GATE input.

Patch Panel CV Processors - Description

The following is a functional description of the Control Voltage Processor section. For all panel functions, jacks with white rings indicate inputs that can accept either a CV or an Expression Pedal.

ATTENUATORS

The Patch Panel features two active Attenuators. These work the same as the active attenuators on other Moog gear, offering normal and inverted attenuation with or without an offset.

The inputs to both attenuators are normalled to other Patch Panel CV sources. Channel 1 is normalled to the LFO2 output, while Channel 2 is normalled to the RIBBON CV OUT. This means that if nothing is connected to the IN jacks on the attenuators, the OUT jacks will be attenuated versions of LFO2 and the RIBBON CV respectively.

Each attenuator also features a powered input jack, which allows you to connect an Expression Pedal.

The Attenuator **AMOUNT** knob controls the gain from -1 (fully CCW) to +1 (fully CW). The **OFFSET** knob allows you to add an offset voltage of -5V to +5V to the input signal. The attenuator output is limited to approximately +/-10V.

FOUR-INPUT MIXER

The Four-Input Mixer allows you to mix up to four CV inputs; these are labeled 1 through 4. Inputs 1 and 2 have input attenuators, while inputs 3 and 4 are mixed without attenuation. Additionally, inputs 1 and 3 can be controlled by Expression Pedals. The **OFFSET** knob raises or lowers the overall voltage of the mix, while the **MASTER** knob adjusts the overall output level. The two **OUT** jacks offer normal and inverted versions of the Mixer outputs.

LAG PROCESSOR

The Lag Processor provides a means of slowing down rapidly changing CV signals. The Lag Processor offers independent control over the leading (RISE) and trailing (FALL) portions of the CV signal. The **RISE** and **FALL** controls adjust the amount of lag from 1 millisecond to 1 second.

LFO2

The LFO2 module provides a second dedicated LFO source for the Voyager XL. The default frequency range of LFO2 is 0.02 Hz (50 seconds) to 20 Hz (0.05 seconds). This range is intended to augment the primary LFO which has a higher frequency range (0.2 to 50 Hz).

LFO2 offers a choice of 6 waveforms with multiple synchronization options. The available front-panel waveforms (selected by the **TYPE** knob) are Triangle, Square, Ramp, Saw (sawtooth), S&H (Sample & Hold) and S&H Smooth. Synchronization options include free running, synced to MIDI, directly clocked from a GATE CV, or controlled by a CV or Expression Pedal. Two complimentary outputs (**OUT +** and **OUT -**) offer normal and inverted versions of the LFO.

Additional functionality for LFO2 is available via MIDI CC commands, including a special dual-mode operation where each output (**OUT +** and **OUT -**) provides an individual LFO with its own rate, waveform and clock divider parameters. For more information, see 'How the Voyager XL Handles MIDI' on page 78.

L – The Back Panel

The back panel provides for all of the Voyager's connectivity, including power, MIDI, audio and CV expansion connections.

POWER CONNECTOR:
This is a standard AC power inlet, Use only a power cord designed to mate with this receptacle. The Voyager power supply is designed to work with power inputs of 100-240 VAC; 50-60 Hz.



IMPORTANT SAFETY NOTE – Do not alter the power connector in any way. Doing so can result in the risk of shock, injury or death. Be familiar with the safety instructions printed at the beginning of this manual. If the connector is damaged, refer servicing to qualified personnel only.

MIDI CONNECTORS:
These are connectors for MIDI IN, OUT and THRU.

LEFT/MONO and RIGHT OUTPUTS:
The **LEFT/MONO** and **RIGHT** outputs are unbalanced ¼" TS jacks for use with standard TS instrument cables.

When just the **LEFT/MONO** output is connected, both channels are summed to this output. A stereo signal is created when both the **LEFT/MONO** and **RIGHT** outputs are used. When the Voyager XL Filter is set to 'Dual Lowpass Mode', the **RIGHT** output can be used by itself for achieving a single lowpass filter sound.

EXTERNAL AUDIO IN:
This is an unbalanced ¼" TS input that accepts any instrument or line level signal and routes the signal to the Mixer. A dedicated **EXTERNAL** input control on the Mixer adjusts the signal level.

MIXER OUT/FILTER IN:
This is a ¼" TRS jack that is used for inserting a processing device between the Voyager XL Mixer and Filters. The tip is the send and the ring is the return (see the illustration on page 17).

TNC LAMP CONNECTOR (2):
These are two 12VDC TNC outlets for a gooseneck lamp.

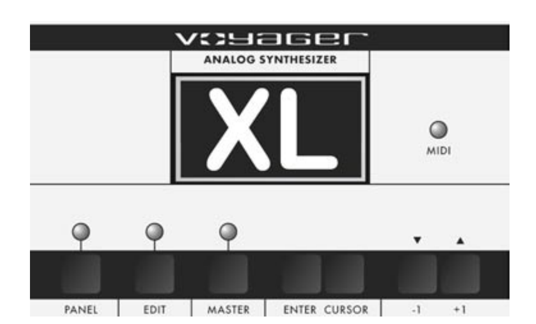


1. You can use the Voyager XL to process any audio signal simply by plugging into the EXTERNAL AUDIO IN jack. To hear the external audio signal without having to hold down a key on the keyboard, set the ENV. GATE switch to 'ON/EXT'. This will trigger the envelopes. Make sure that the Volume Envelope SUSTAIN control is set to maximum. The Volume Envelope will remain at its Sustain level until the ENV. GATE switch is changed to 'KEYB'.

2. The EXTERNAL AUDIO INPUT is not limited to processing monophonic signals - it can work well for processing polyphonic signals, too. For example, connect the MIDI Out of the Voyager XL to the MIDI Input of another polyphonic keyboard, then feed that audio output back into the Voyager XL through the EXTERNAL AUDIO IN. Now you have a *polyphonic* source that is being affected by the Voyager's Filter and EGR circuits.

M – Interface Panel

The Interface Panel provides a status display and controls for all of the Voyager XL software functions and instrument settings.



The status display is an LCD screen located within the Interface Panel. When the Voyager XL is first powered on, the screen will display an 'XL' greeting message. The message will stay on the screen for a few seconds, and then the screen will display the active preset. This preset will be the last preset in use when the Voyager was powered down.

The Voyager XL has three operating modes which are accessed on the Interface Panel:

PANEL: Used for accessing the Voyager XL presets and performance functions.
EDIT: Used for editing the parameters of a preset which are not accessed through the front panel control knobs and switches. Naming and saving presets is done in EDIT mode.
MASTER: Used for accessing global settings for the Voyager, and data send and receive functions.

The LED's located above the PANEL, EDIT and MASTER buttons will be lit when the respective operating mode is selected. A MIDI LED located near the LCD screen will light whenever the Voyager receives an incoming MIDI message on the correct MIDI channel.

Section Controls:

Panel:
Pressing the **PANEL** button places you in Panel Mode, where you select Voyager XL presets and basic performance functions. For complete description of Panel Mode operations and functions, see page 43.

Edit:
Pressing the **EDIT** button places you in Edit Mode, where you can edit menu-based preset parameters. For a complete description of the Edit Mode operations and functions, see page 48.

Master:
Pressing the **MASTER** button places you in Master Mode, where you can access global settings, MIDI options and operating system functions. For a complete description of the Master Mode operations and functions, see page 63.

Enter:
The **ENTER** button is used to enter and store all changes (presets and global), and is occasionally used as a navigation control in certain menus. In Panel Mode, pressing the **ENTER** button will advance to the next preset within the currently selected sound category when categories are displayed on the LCD.

Cursor:
The **CURSOR** button is used to navigate the display and make menu selections.

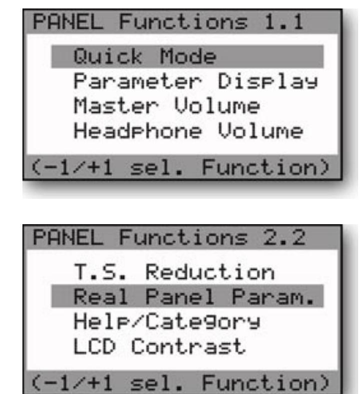
-1/+1:
The **-1/+1** buttons are used to select presets in Panel Mode, and choose functions and select parameter values in Panel, Edit and Master modes.

Panel Mode

Panel Mode is used to access presets and other performance functions. Pressing the **PANEL** button accesses Panel Mode. The LED above the **PANEL** button will be lit, and the preset name and location will be displayed. A preset consists of all the stored settings of the front panel controls (except FINE TUNE) plus the preset's software parameters. Once a preset is called up, the front panel controls and software parameters can be used to adjust the parameters of the sound. When a front panel control is changed, the stored value jumps to the absolute position of the control. Changes to a preset can be saved in Edit Mode (see 'SAVE PRESETS', page 64). If you wish to get back to the original sound after modifying the parameters, simply press **ENTER** and the original preset will be reloaded. Pressing **ENTER** stores the tweaked sound into a memory buffer that can be brought back through the RECALL function in Edit Mode. Once the program number is changed, the buffer is cleared.

Presets are stored in one the Voyager XL's memory locations. These memory locations are organized into 8 banks of 128 presets each; the first 7 banks can be overwritten (the last bank is a ROM bank that cannot be overwritten). The banks are labeled A to H, and bank locations are numbered from 1 to 128. Presets can be changed incrementally using the **-1/+1** buttons. You can also scroll through presets in a bank using the **EXTERNAL** level control on the Mixer (when the Mixer's **EXTERNAL** switch is in the OFF position), or specify a preset through a MIDI Program Change command. To change banks, press and hold the **CURSOR** button and use the **-1/+1** buttons to advance forward or backward through the banks. Banks can also be selected through a MIDI Bank Select message.

Once in Panel Mode, pressing the **PANEL** button a second time accesses the Panel Mode menus shown below. The Voyager XL has eight Panel Mode functions that span two pages as shown.



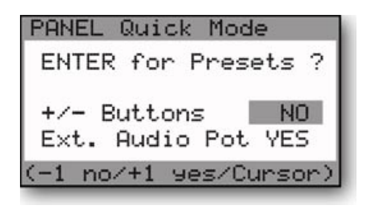
Voyager XL PANEL Functions

To select a Panel Mode menu function, use the **-1/+1** buttons to highlight the desired function and then press **ENTER**. A description of the Panel Mode functions follows.



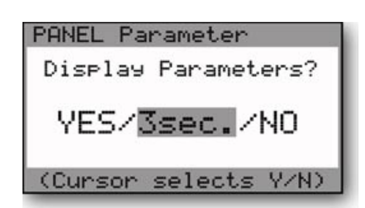
In PANEL, EDIT or MASTER mode, when you reach the bottom of the menu pages, the next "-1" button press will wrap back to the top item on the first menu page.

QUICK MODE:



The QUICK MODE function is used to select whether preset changes take effect immediately or if activation must include pressing the **ENTER** button. This extra selection step is intended for a live performance situation, where you may want to dial up a new preset while continuing to play the current preset. With this function enabled ('YES'), the newly selected preset only becomes active when you press the **ENTER** button. To change the Quick Mode, use the **CURSOR** to highlight the desired choice and press **ENTER**.

PARAMETER DISPLAY:

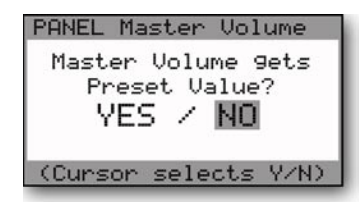


PARAMETER DISPLAY is used to monitor changes to the values of a preset's parameters. There are three choices for this feature as shown. Choose 'YES', and a change in the position of a knob or switch on the front panel causes the display to show the preset's stored value and the new value simultaneously. The last parameter changed will be displayed. Choose '3 sec.', and the current and stored values are displayed for approximately 3 seconds before the display returns to the preset name and number. Choose 'NO' and this function is off. To make a change in the Parameter Display menu, use the **CURSOR** to highlight the desired choice and press **ENTER**.



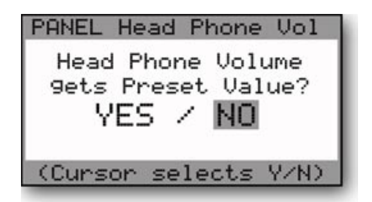
The Voyager XL Operating System has been improved to eliminate the stepping that can occur when multiple pots are tweaked, but it requires that the PARAMETER DISPLAY function be set to 'NO' to ensure smooth operation.

MASTER VOLUME



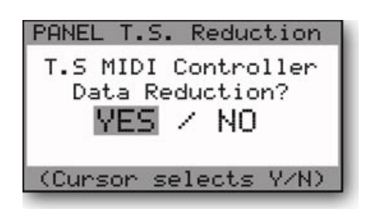
MASTER VOLUME is used to determine whether the stored Master Volume value is loaded when a new preset becomes active. If this is off, then this value is determined by the current position of the **MASTER VOLUME** control. To make a change in the Master Volume menu, use the **CURSOR** to highlight the desired choice and press **ENTER**.

HEADPHONE VOLUME:



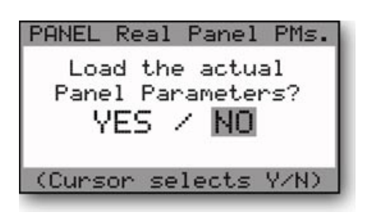
HEADPHONE VOLUME is used to determine whether the stored Headphone Volume value is loaded when a new preset becomes active. If this is off, then this value is determined by the current position of the **HEADPHONE VOLUME** control. To make a change in the Headphone Volume menu, use the **CURSOR** to highlight the desired choice and press **ENTER**.

T.S. REDUCTION:



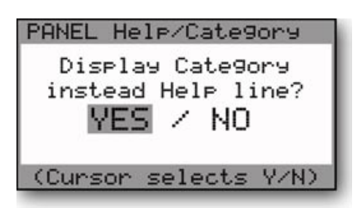
T.S. REDUCTION (Touch Surface Reduction) thins the number of MIDI CCs sent by the Touch Surface Inputs when more than one is used at a time. The amount of MIDI data produced by the Touch Surface can be immense, and can crash some MIDI devices. To make a change in the T.S. Reduction menu, use the **CURSOR** to highlight the desired choice and press **ENTER**.

REAL PANEL PARAM.:



REAL PANEL PARAM (Real Panel Parameters) is a function that enables the operation of the Voyager from the actual settings of front panel controls, rather than preset memory. If you select 'YES' the sound produced when the Voyager is played will be determined by the settings of the front panel controls. To make a change in this menu, use the **CURSOR** to highlight the desired choice and press **ENTER**.

HELP/CATEGORY:



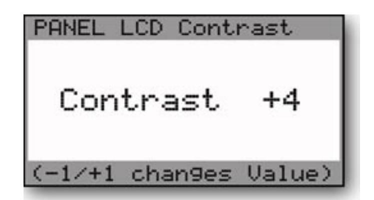
The HELP/CATEGORY function allows you to display either a Help message or the Sound Category of a preset on the bottom line of the Panel Mode display. Help messages provide operational assistance and users control options, such as the "Cursor selects Y/N" message shown at left. The Help message text changes appropriately depending on the information displayed on the LCD.

Sound Categories are designed to assist in organizing presets for quick identification when auditioning sounds. This can be especially useful in conjunction with the Voyager Editor software. Sound Category is a parameter that can be assigned in Edit Mode and saved as a part of a preset. When 'Category' (sound category) is chosen instead of 'Help Line', the bottom of the LCD will display the sound category of the selected preset as shown below. To make a change to the Help/Category function, use the **CURSOR** to highlight the desired choice and press **ENTER**.

"Bright Bass" is one of 32 assignable sound categories. For a complete list of all the categories as well as details on assigning sounds, refer to Edit Mode section 6.2 - SOUND CATEGORY



LCD CONTRAST



The LCD CONTRAST function changes the viewable angle of the LCD display. To change this setting, use the **-1/+1** buttons to adjust the contrast level. The change will immediately take effect (you'll see the display contrast change) and the new contrast value will be stored automatically.

OTHER PANEL MODE FUNCTIONS

QUICK SAVE:
If a preset has been edited, then pressing the **MASTER** switch twice saves the preset to the present location.

SOUND CATEGORY BROWSE:
When Categories are displayed on the LCD, pressing **ENTER** will advance to the next available sound in the bank or in the subsequent bank within the same sound category (useful for searching for all lead sounds, bass sounds, percussion sounds, etc.). Pressing **ENTER** and **CURSOR** reverses the direction, going backwards in the progression of the sounds in that category.

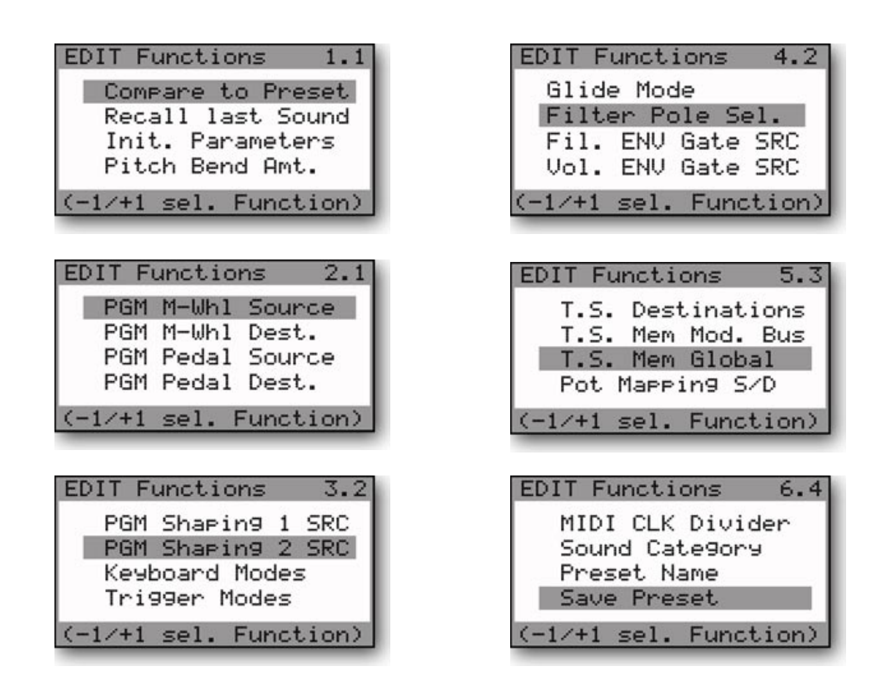
RECEIVE SINGLE PRESET:
This does not appear as an option in the Panel Mode menu, but is used in conjunction with 'Receive Presets' in Master Mode. In Master Mode, make sure SysEx is enabled in 'Receive Presets'. Once this is done, a single preset can be received to the current active preset location in Panel Mode. Once a preset is received in the current active location, it can be auditioned. If you want that preset to become part of the Voyager's preset bank, you must save the imported preset. If it is not saved and the current preset number is changed, the imported preset is wiped from the Voyager's preset memory buffer.

COMPARE:
Compare is a feature in Panel Mode, linked to the Edit Mode 'COMPARE TO PRESET' function. Pressing the **CURSOR** activates this function – loading the sound in the Compare buffer, and pressing **ENTER** returns to the active preset. To load a Preset into the Panel Compare buffer, go to Edit Mode, select 'COMPARE TO PRESET' and press **ENTER**. Use the cursor to move to the Preset field. Press **PANEL** to go back to Panel mode. Now when you press **CURSOR**, the preset should show as being loaded into the Compare buffer. It will remain there until the Compare function is used in Edit Mode.

Edit Mode

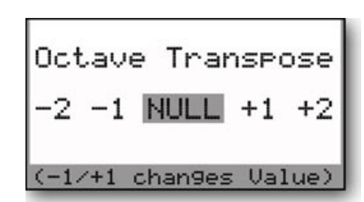
Edit Mode is used to assign the parameters of a preset that are not accessible through the front panel controls. Edit Mode is also used to assign the preset sound category, set the MIDI clock divider, and name and save presets. Press the **EDIT** button to enter Edit Mode. To select an Edit Mode function, use the **-1/+1** buttons to highlight the desired function and then press **ENTER.**

The Voyager XL has twenty four Edit Mode functions that span six pages as shown below.



Voyager XL EDIT menus

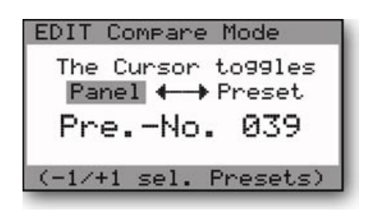
In addition to the functions shown, Edit Mode also features an octave transpose function that allows you to shift the Voyager XL Keyboard up to plus or minus two octaves. To access the transpose menu at any time, press the **EDIT** button twice (press once if already in Edit Mode). The display will appear as shown. Use the **-1/+1** buttons to transpose the octave as desired (NULL is the Voyager XL default setting). The new transpose setting will remain until it is changed, or until the Voyager XL is powered off.



To exit the transpose menu, press **EDIT.**

Here are the Edit Mode functions:

1.1 COMPARE TO PRESET

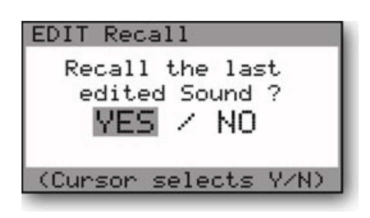


The COMPARE TO PRESET function is used to compare the current Panel sound to any other preset in the current Preset bank. Applications for this include comparing an edited version of a sound to its original version in memory, or to find a preset location that you do not use where you can store your current Panel Sound. The sound that is currently heard when the Voyager is played is the one highlighted on the 'Compare' screen. The **CURSOR** button is used to change between the panel sound and a preset. The Preset number can be changed with the **- 1/+1** buttons, but only presets in the current bank can be selected.



If you leave the 'Compare' screen by pressing the PANEL button and do not change the preset, you can still toggle between the panel sound and preset sound by pressing ENTER for the panel sound and CURSOR for the preset sound.

1.2 RECALL LAST SOUND:

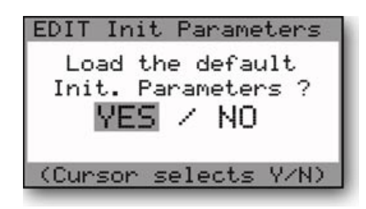


The RECALL LAST SOUND function can be used to return to a previously edited version of a sound. This is used in conjunction with Panel Mode. If you are in Panel Mode and make changes to a preset and then press **ENTER**, the sound reverts to the original saved settings. If you want to get back to your edited sound, press the **EDIT** button and select the 'RECALL LAST SOUND' function. Use the **CURSOR** to select 'YES' and press **ENTER**. You will now hear the changes you made to the preset. If you wish to keep those changes, you must save the preset. See Edit Mode function 6.4 'SAVE PRESET' for more information.



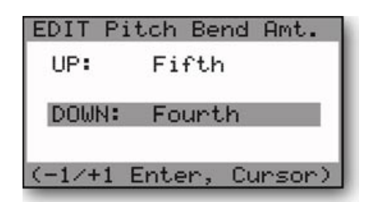
The 'Recall' function can also be used to return to a preset sound after the parameters are initialized or REAL PANEL PARAMETERS has been switched on.

1.3 INIT. PARAMETERS (Initialize Parameters)



The INIT PARAMETERS function allows you to reset the current values of the Voyager's parameters to a single oscillator basic sound which can then be used as a starting point for new sound development. To set the Voyager parameters to an initialized state, use the **CURSOR** to select 'YES' and press **ENTER**. A list of the complete initialization parameters appears in Appendix B.

1.4 PITCH BEND AMT. (PITCH BEND AMOUNT):



The PITCH BEND AMT function allows you to set separate up and down pitch bend ranges for each preset. To adjust the ranges, use the **CURSOR** to toggle between the Pitch Bend UP and Pitch Bend DOWN parameters, and use the **-1/+1** buttons to select the desired range.

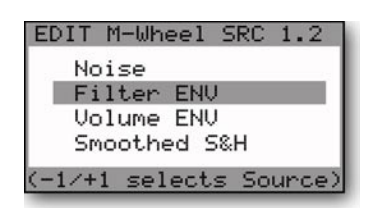
The selection ranges for the UP and DOWN parameters are:

Off	± Fourth (default)	± 2 Octaves
± 2 Semitones	± Fifth	± 2 Octaves & 5th
± Minor Third	± 1 Octave	Pre. –Value
± Major Third	± 1 Octave & 5th	



'Pre. –Value' is a user defined amount. The value of this is set with the EXTERNAL level control on the Mixer. To set the value, simply push the Pitch Bend Wheel forward and listen to the pitch change as you rotate the EXTERNAL control, stopping when the desired interval is reached.

2.1 PGM M-WHL SOURCE (Programmable Modulation Wheel Source)



PGM M-WHL SOURCE that allows you to program one of 8 additional modulation sources to be used when the Mod Wheel Bus **SOURCE** control is set to 'NOISE/PGM'. To select a source, use the **-1/+1** buttons to highlight the desired selection and press **ENTER**.

The available sources are:

Noise (default)	Oscillator 1
Filter ENV	Oscillator 2
Volume ENV	Touch Surface X
Smoothed Sample and Hold	Touch Surface Y

2.2 PGM M-WHL DEST. (Programmable Modulation Wheel Destination):

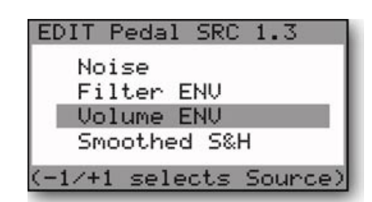


PGM M-WHL DEST allows you to program one of 8 additional modulation destinations to be used when the Mod Wheel Mod Bus **DESTINATION** control for the set to 'LFO RATE/PGM'. To select a destination, use the **-1/+1** buttons to highlight the desired selection and press **ENTER**.

The available destinations are:

LFO Rate (default)	Osc. 1 Level
Filter Resonance	Osc. 2 Level
Filter Spacing	Osc. 3 Level
Panorama (panning)	Noise Level

2.3 PGM PEDAL SOURCE (Programmable Pedal Source)



PGM PEDAL SOURCE allows you to program one of 8 additional modulation sources to be used when the Pedal/ON Bus **SOURCE** control is set to 'NOISE/PGM'. To select a source, use the **-1/+1** buttons to highlight the desired selection and press **ENTER**.

The available sources are:

Noise (default)	Oscillator 1
Filter ENV	Oscillator 2
Volume ENV	Touch Surface X
Smoothed Sample and Hold	Touch Surface Y

2.4 PGM PEDAL DEST. (Programmable Pedal Destination):

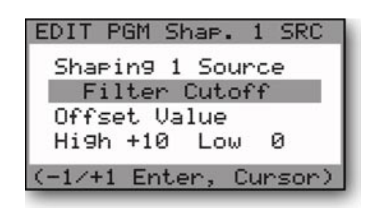


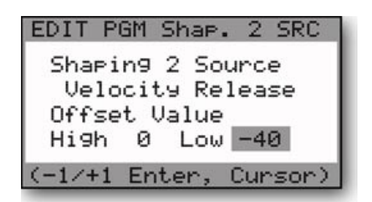
PGM PEDAL DEST allows you to program one of 8 additional modulation destinations to be used when the Pedal/ON Bus **DESTINATION** control is set to 'LFO RATE/PGM'. To select a destination, use the **-1/+1** buttons to highlight the desired selection and press **ENTER**.

The available destinations are:

LFO Rate (default)	Osc. 1 Level
Filter Resonance	Osc. 2 Level
Filter Spacing	Osc. 3 Level
Panorama	Noise Level

3.1 PGM SHAPING 1 SRC (Programmable Shaping 1 Source)
3.2 PGM SHAPING 2 SRC (Programmable Shaping 2 Source):





There are two programmable shaping sources. Both shaping sources are identical, and both are combined by the software and shared by both Mod Busses. When either of the Mod Bus **SHAPING** controls are in the 'ON/PGM' position, the programmable shaping values stored in memory are applied to shape the Mod Buss source signal. Shaping is like an additional level control for the modulation amount. As an example, if Velocity is used as a shaping source, the higher the velocity value, the more the Mod Source is passed to the Destination. PROGRAMMABLE SHAPING SOURCE 1/2 also allows an offset value to be applied, which is added to the shaper itself.

Programmable Shaping Sources are useful for creating presets that respond in complex ways. For instance, you could assign both Keyboard CV (pitch) and Velocity Release (velocity) as the Programmable Shaping Sources. With this assignment, the higher and the harder you play, more modulation source is passed to modulate the destination. Many of the shaping sources are front panel rotary controls. A suggested application using a front panel control as a shaping source is having the Filter Cutoff control the Modulation amount. Programmable Shaping Sources can make for some highly interesting and interactive presets.

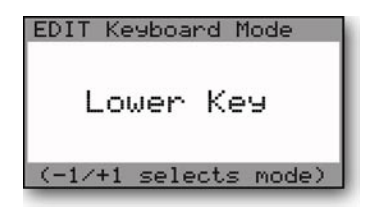
There are 43 assignable shaping sources for Programmable Shapers 1 and 2:

- Fixed Value (see below)
- Pitch Bend Wheel
- Modulation Wheel
- Velocity Release
- Pressure (AT)
- Keyboard CV
- Touch Surface X
- Touch Surface Y
- Touch Surface A
- Mod1
- Mod2
- LFO Rate
- Glide Rate
- Mod.Wheel Amt
- Pedal Amount
- Osc.1 Octave
- Osc. 1 Waveform
- Osc. 2 Frequency
- Osc. 2 Octave
- Osc. 2 Waveform
- Osc. 3 Frequency
- Osc. 3 Octave
- Osc. 3 Waveform
- Ext. Audio Level
- Osc. 1 Level
- Osc. 2 Level
- Osc. 3 Level
- Noise Level
- Filter Cutoff
- Filter Spacing
- Filter Resonance
- Filter KB Control Amt
- Filter Attack
- Filter Decay
- Filter Sustain
- Filter Release
- Filter Envelope Amt
- Volume Attack
- Volume Decay
- Volume Sustain
- Volume Release
- Master Volume
- Headphone Volume

The Fixed Value parameter is an offset voltage that can be used by itself or added to one of the shaping sources. Fixed Value has a course adjustment labeled 'HIGH' and a fine adjustment labeled 'LOW'. Both HIGH and LOW Fixed Values are adjustable from -64 to +64 (a total range of +/- 2.5 V).

To configure the shaping parameters, use the **CURSOR** button to move between the SHAPING SOURCE, the HIGH Fixed Value and the LOW Fixed Value fields, then use the **-1/+1** buttons to make the selections.

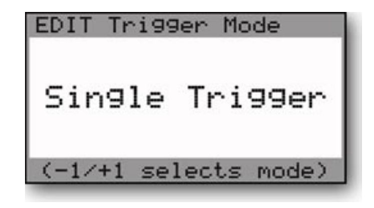
3.3 KEYBOARD MODES



KEYBOARD MODE allows you to select one of 4 types of keyboard priority for a preset. The keyboard priority determines what happens when more than one key is pressed on the keyboard. To set the Keyboard Mode, use the **+/-1** buttons to select one of the following options:

Lower Key (the lowest key pressed sounds)
Higher Key (the highest key pressed sounds)
Last Key (the most recent key pressed sounds)
1 Key Only (the first key pressed sounds)

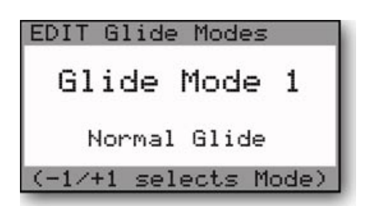
3.4 TRIGGER MODES



TRIGGER MODE allows you to select how the envelopes are triggered when more than one key is pressed on the keyboard. To set the Trigger Mode, use the **+/-1** buttons to select one of the following options:

Single Trigger (legato, envelopes aren't retriggered until keys are fully released)
Multi Trigger (each time a new note sounds, the envelopes are triggered)

4.1 GLIDE MODES

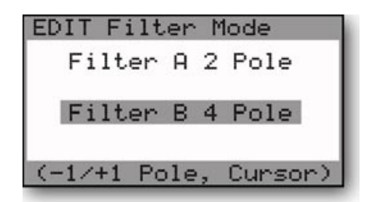


The Glide Modes menu allows you to select the glide mode for the current Preset. This setting determines how Glide behaves when the **GLIDE** switch is ON. There are eight glide modes:

Mode 1: Normal Glide (Glide is always ON)
Mode 2: Legato Glide (Glide is only ON when you play legato)
Mode 3: Legato Glide to 2nd Only (Glide is OFF when not playing legato, when the first note of a legato phrase is played, and when returning to the first held note of a legato phrase. Glide is ON for the 2nd + notes of a legato phrase.)
Mode 4: Legato Glide back to First only (Glide is OFF when not playing legato. When the first note of a legato phrase is played, and when subsequent notes are played legato, glide is ON when returning to the first held note of a legato phrase)
Mode 5: Legato 1st Note (Glide is ON if not playing legato and is OFF when playing legato)
Mode 6: Mode 4+5 combined (This is Glide Mode 4 and 5 combined)
Mode 7: Legato back to first = glide off (Glide is ON when not playing legato, and when playing legato but is OFF when returning to the first held note of a legato phrase)
Mode 8 : Legato Glide toggling (For legato playing, glide is ON for two notes, then OFF for two notes)

To select a Glide Mode, use the **-1/+1** buttons.

4.2 FILTER POLE SEL.



This function allows you to specify the cutoff slopes of Filter A & B. Filter A is the filter controlled only by the **CUTOFF** control, while Filter B is controlled by both the **CUTOFF** control and the **SPACING** control. In Dual Lowpass Mode, the output of Filter A appears on the **RIGHT** output jack, and Filter B appears on the **LEFT** output jack (when both outputs are connected). In Highpass/Lowpass Mode, Filter A is the Lowpass filter, and Filter B is the Highpass filter. Use the **-1/+1** buttons to select the cutoff slope, which is specified in 'poles' (1, 2, 3 or 4 poles). Each filter pole adds 6dB/octave of attenuation to the filter cutoff, so a 1 pole filter has a 6 dB/oct cutoff slope (when it's a lowpass filter you hear it as very bright), while a 4 pole filter has a 24 dB/oct cutoff slope (when it's a lowpass filter you hear it as smooth and dark, yet warm).



Changes made to the Filter A or B Pole Selection menus take effect immediately (you do not need to press ENTER). This feature allows you to hear the result of the change without leaving the menu.

4.3 FIL. ENV GATE SRC (Filter Envelope Gate Source)
4.4 VOL. ENV GATE SRC (Volume Envelope Gate Source)



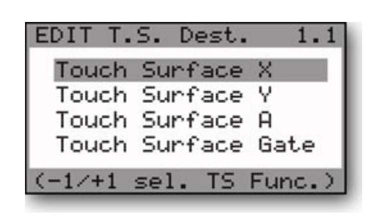
EDIT Volume ENV SRC
Volume ENV Gate
MIDI Clock
(-1/+1 selects Source)

These two Envelope Gate functions allow gate sources other than the keyboard and the external gate input (the **ENV GATE** jack) to be assigned to trigger the Voyager XL Envelope Generators when the Envelope Gate switch is in the 'ON/EXT' position. The default parameter for both Envelope Sources is 'Envelope Gate Input' .

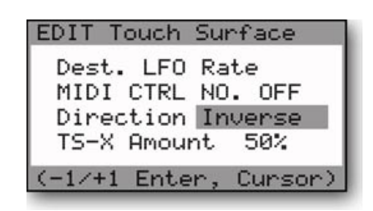
The assignable Gate Sources are:

- Envelope Gate Input (this defaults to ON when nothing plugged into the **ENV GATE** jack)
- Touch Gate (this is the gate signal from the **TOUCH SURFACE** controller)
- S&H Gate (this defaults to the LFO square wave when nothing plugged into the **S&H GATE** jack)
- MIDI Clock
- Keyboard Gate
- Gate is ON
- Gate is OFF

5.1 T.S. DESTINATION (Touch Surface Destination):



The Voyager XL Touch Surface produces four controls signals labeled X,Y, A, and Gate. The X and Y control signals are generated by touching the touch surface and reflect the left-right position and up-down position, respectively. The A control signal is generated by calculating the area of contact with the Touch Surface. The larger the area covered, the greater the control signal. The Gate control signal is produced when you make contact with the Touch Surface. Each of the four Touch Surface control parameters has its own dedicated menu. Use the **-1/+1** buttons to select the desired TS control parameter and then press **ENTER**.



A new display will appear, similar to the one shown at left for the TSX control. The TSX, TSY and TSA menus are identical and have the same assignable options (the TS Gate menu is different, and is covered separately later in this section). The TSX, TSY and TSA menus allow you to select the touch surface destination (DEST.), the MIDI Control Number (MIDI CTRL NO.), the control polarity (DIRECTION), the Amount, and the LFO Sample & Hold (LFO S&H). The assignable options for each are listed below. To return to the Touch Surface menu, press **ENTER**.

Destination (DEST.): There are 32 destinations for the Touch Surface outputs X, Y and A. Note that the X,Y and A outputs are generated only when you make contact with the Touch Surface.

- LFO Rate
- Glide Rate
- Mod Wheel Mod Bus amount (MOD WHL AMT)
- Pedal/ON Mod Bus amount (PEDAL AMT)
- Oscillator 1 octave (OSC 1 OCT)
- Oscillator 1 waveform (OSC 1 WAVE)
- Oscillator 2 frequency (OSC 2 FREQ)
- Oscillator 2 octave (OSC 2 OCT)
- Oscillator 2 waveform (OSC 2 WAVE)
- Oscillator 3 frequency (OSC 3 FREQ)
- Oscillator 3 octave (OSC 3 OCT)
- Oscillator 3 waveform (OSC 3 WAVE)
- External Audio Input level (EXT. AUDIO)
- Oscillator 1 level (OSC 1 LEV)
- Oscillator 2 level (OSC 2 LEV)
- Oscillator 3 level (OSC 3 LEV)
- Noise level (NOISE LEV)
- Filter cutoff (FIL CUTOFF)
- Filter spacing (FIL SPACING)
- Filter resonance (FILTER RES)
- Filter keyboard control (FIL KB CTRL)
- Filter attack (FIL ATTACK)
- Filter decay (FIL DECAY)
- Filter sustain (FIL SUSTAIN)
- Filter release (FIL RELEASE)
- Filter envelope amount (FIL ENV AMT)
- Volume attack (VOL ATTACK)
- Volume decay (VOL DECAY)
- Volume sustain (VOL SUSTAIN)
- Volume release (VOL RELEASE)
- Master Volume (MASTER VOL)
- Key Pitch

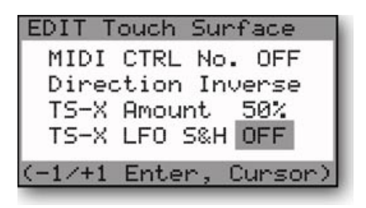
MIDI Control Number (MIDI CTRL NO.): The Touch Surface inputs can transmit user-selected MIDI CC Messages. For each of the X, Y and A axes, the Touch Surface Inputs can be set to transmit MIDI CCs 1-31, or it can transmit no MIDI information (OFF). If you are using the Voyager with a sequencer, then you'll want to transmit the CC numbers that corresponds to the Touch Surface Destinations. If you are using the Touch Surface Inputs to control other MIDI devices, then you can choose the MIDI CC numbers appropriate to the parameters you wish to control in that device.

Polarity (DIRECTION): This selects a direction for the Touch Surface inputs to modulate the destination. The assignable values are NORMAL or INVERTED. For the X and Y axis, 'NORMAL' means a voltage change from -5V to +5V *increases* the destination value, while 'INVERTED' means the same voltage change *decreases* the destination value. For the Area (A) parameter, 'NORMAL' means a voltage change of 0 to +5 *increases* the destination value, while 'INVERTED' means the same voltage change *decreases* the destination value.

TS AMOUNT: This parameter sets the amount of Touch Surface modulation of the destination. The assignable values are OFF, 25%, 50%, and 100%. Each axis can be set independently. 'OFF' means that axis does not modulate the destination. '50%' means that the amount of the touch surface output adds 50% of the total range of that control to its present value. For example, if the TSX destination is set to 'Filter Cutoff' and the amount is set to 50%, when the filter **CUTOFF** control knob is fully counter clockwise, the maximum TSX value (all the way to the right of the TS panel) would make a change in the filter cutoff equal to turning the **CUTOFF** knob to the mid-position (in other words, about 50%). When the amount is set to '100%', the Touch Surface output equals the full range of the destination's control.

LFO Sample & Hold (LFO S&H): This function allows the X, Y and A control signals to be sampled at the rate set by the Sample and Hold Gate (normally the LFO square wave), providing a new and innovative way to use the Touch Surface.

The LFO S&H function is the fifth option in the Touch Surface menu. Since the Touch Surface menu can only display four options at a time, use the **CURSOR** to scroll down to the bottom of the list, where the LFO S&H option will appear:



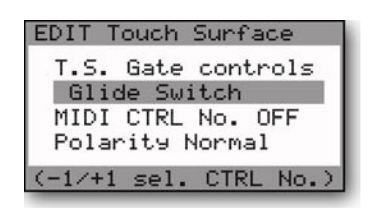
Use the **-1/+1** buttons to switch the LFO S&H function ON or OFF. The control menus for the Touch Surface X, Y and A signals are identical, and each can have the S&H function switched ON or OFF individually.

For more on using the Touch Surface LFO S&H function, see Appendix A.



The Touch Surface sample is actually taken on both the rising and falling edges of the primary LFO Square Wave, which means that the actual sample rate of the TS LFO S&H is double the LFO rate.

Touch Surface Gate Menu:



The TS Gate menu allows you to select the gate control (T.S GATE CONTROL), the MIDI Control number (MIDI CTRL NO.), the gate polarity (POLARITY), and the LFO Restart function. The assignable options for these parameters are listed below.

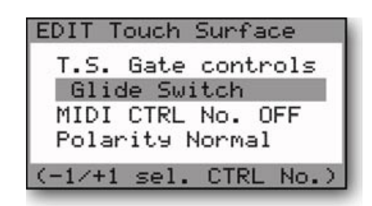
T.S. Gate Controls: There are 14 destinations for the Touch Surface Gate output parameter. 'NO SWITCH' is the default destination:

- No Switch
- Glide Switch
- Release Switch
- Oscillator 1-2 Sync switch (OSC 1-2 SYNC)
- Oscillator 3-1 FM switch (OSC 3-1 FM)
- Oscillator 3 Keyboard Control switch (OSC 3 KB CTRL)
- Oscillator 3 Frequency Range switch (OSC 3 FREQUENCY)
- External Audio On/Off switch (EXTERNAL AUDIO)
- Osc.1 On/Off switch (OSCILLATOR 1)
- Osc.2 On/Off switch (OSCILLATOR 2)
- Osc. 3 On/Off switch (OSCILLATOR 3
- Noise On/Off switch (NOISE SWITCH)
- Filter Mode switch (FILTER MODE)
- Envelope Gate switch (ENV GATE SWITCH)

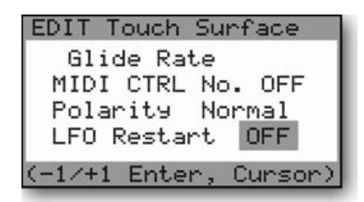
MIDI Control Number (MIDI CTRL NO.): The Touch Surface Inputs can transmit user-selected MIDI CC Messages. The T.S. Gate Input can transmit MIDI CCs 64-127, where 0 = OFF and 64 = ON, or it can transmit no MIDI information (OFF).

Polarity: This selects the direction for the Touch Surface inputs to effect the destination. The assignable values are NORMAL or INVERTED. 'NORMAL' means the gate signal turns a switch ON (Note: If '3 KB CONT' is the selected destination, the Gate will turn the 3 KB CONT switch OFF when the NORMAL polarity is selected). When the Gate is OFF (no contact with the Touch Surface), the switch is OFF. 'INVERSE' means a Gate Signal from the Touch Surface turns the destination switch OFF, and when the Gate is OFF, the switch is ON.

TS GATE (con't)

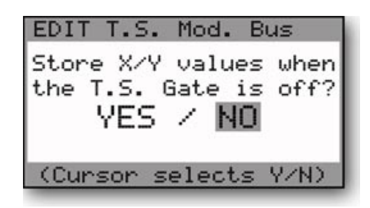


The LFO Restart function is the fourth option in the TS Gate Control menu. Since the TS Gate Control menu can only display three options at a time, use the **CURSOR** to scroll down to the bottom of the list, where the LFO Restart option will appear.



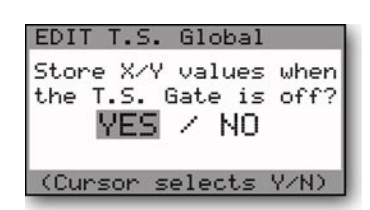
Use the **-1/+1** buttons to switch the LFO Restart function ON or OFF. When LFO Restart is ON, a gate generated from touching the Touch Surface will restart the LFO cycle. For the Gate LFO Restart function to operate, the front panel **LFO SYNC** control must be set to "MIDI" when the LFO Restart function is switched 'ON'.

5.2 T.S. MEM MOD BUS (Touch Surface Memory Modulation Bus)



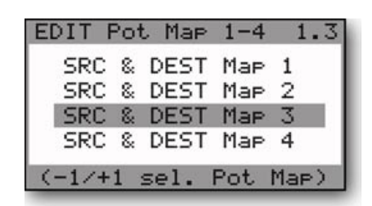
The TS MEM MOD BUS function is for allowing the last known X and Y parameters of the Touch Surface inputs to be held in memory after contact is no longer made with the touch surface. The held values only apply to those used as the programmable Sources in the Mod Busses, however. When this function is off, the X and Y values return to zero after contact with the touch surface is no longer made.

5.3 T. S. MEMORY GLOBAL (Touch Surface Memory Global)

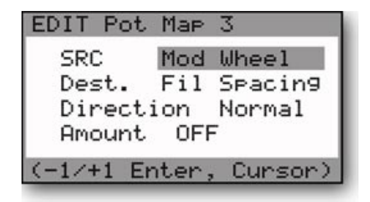


The TS MEMORY GLOBAL function adds memory to the direct destinations of Touch Surface X and Y inputs. When the Touch Surface Gate input goes off after being on, the last X and Y values are remembered until the next time the Gate goes on.

5.4 POT MAPPING S/D (Pot Mapping Source and Destinations)



The POT MAPPING S/D function allows up to four separate modulation routings, independent of the Mod Busses. In Pot Mapping, the programmable modulation sources and destinations can be performance controls (like Pitch Bend or Velocity), or front panel controls (like the **LFO Rate** control). Each of the four mappings has it own dedicated menu. Use the **-1/+1** buttons to select the desired map and then press **ENTER.**



A new menu will appear, similar to the one shown at left for Pot Map 3. All four map menus are identical and have the same assignable options. The menu allows you to select the source (SRC), the destination (DEST.), the direction, and the amount for each of the four mappings. Use the **CURSOR** to move to the desired parameter, then use the **-1/+1** buttons to select the desired value.

Source and Destination (SRC/DEST): The Source and Destination parameters allow you to select from the 40 assignable Pot Mapping Sources and Destination options. Eight of these are Performance Controls and 32 are Front Panel Controls. Both the Source and Destination have the same assignable options. The complete list is shown below.

Performance Controls:

- Pitch Bend
- Modulation Wheel (the default Source for Pot Map 3)
- Pressure
- Velocity Attack (the default Source for Pot Map 1)
- Velocity Release
- MOD 1 (the default Source for Pot Map 4)
- MOD 2
- Key Pitch (the default Source for Pot Map 2)

Front Panel Controls:

- LFO Rate
- Glide Rate
- Mod Wheel Amount
- Pedal Amount
- Osc. 1 Octave
- Osc. 1 Wave
- Osc. 2 Frequency
- Osc. 2 Octave
- Osc. 2 Waveform
- Osc. 3 Frequency
- Osc. 3 Octave
- Osc. 3 Waveform
- Ext. Audio Level
- Osc. 1 Level
- Osc. 2 Level
- Osc. 3 Level
- Noise Level
- Filter Cutoff
- Filter Spacing
- Filter Resonance
- Filter KB Control Amount
- Filter Attack
- Filter Decay
- Filter Sustain
- Filter Release
- Filter Envelope Amount
- Volume Attack
- Volume Decay
- Volume Sustain
- Volume Release
- Master Volume
- Headphone Volume

Direction: This specifies the direction for the Source to effect the Destination. The assignable values are NORMAL or INVERTED. With 'NORMAL' selected, as the value of a Source is increased, the value to the Destination is also increased. 'INVERTED' means the opposite – as a Source's value is increased the value to the Destination is decreased.

Amount: This specifies the amount of the Destination's total range that the Source affects, expressed as a percentage. The assignable values are OFF, 25%, 50%, or 100%. 'OFF' means that none of the Source will affect the Destination range (basically the same as 0%).

A setting of '25%' means that the Source will affect one quarter of the Destination range. A setting of '50%' means that the Source will affect half of the Destination range, and a setting of '100%' means that the Source will affect all of the Destination range.



Pot Mapping is a very powerful addition to the Voyager XL front panel controls, as it creates the ability to route controls to more than one destination. A simple use is for dynamically controlling Volume with the Keyboard's Note On Velocity, a common modulation in modern synthesizers. Here are a few more suggested mappings:

1. Keyboard Scaling: This map will adjust the Volume Decay envelope so that higher notes will decay quicker than lower notes. Useful with percussive patches to imitate the characteristic of string instruments.

Src: Key Pitch
Dest: Vol Decay
Direction: Invert
Amount: 50%

2. Dynamic Filter Control: This map will program the Voyager Filter Cutoff to respond to your touch. The harder you hit the keyboard, the brighter the sound. For maximum expressiveness, combine this map with the dynamic Volume Control map suggestion above.

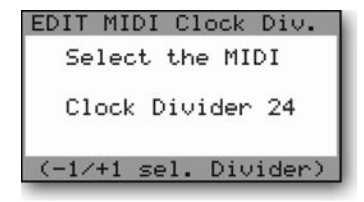
Src: Veloc. Att.
Dest: Fil Cutoff
Direction: Normal
Amount: 25, 50 or 100% (set to taste)

3. Filter Cutoff with Pitch Bend: To provide more emphasis on solos, use this mapping to boost the Filter Cutoff when the Pitch Bend wheel is increased.

Src: Pitch Bend
Dest: Fil Cutoff
Direction: Normal
Amount: 25%

Alternate suggestion: Try the Filter Cutoff mapping above with Pitch Bend set to OFF so that the Pitch Wheel has no effect on pitch. Now pull the Pitch Bend wheel all the way back and release it. The wheel will spring forward, overshooting the center, causing the filter to 'bounce'. Funky and fun!

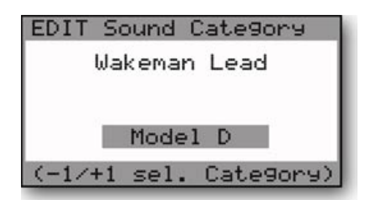
6.1 MIDI CLOCK DIVIDER



When the **LFO SYNC** switch is set to MIDI, a MIDI Clock signal will retrigger the start of the LFO cycle. MIDI clock can also be used to trigger envelopes (see Edit Mode items 4.3 & 4.4 – Filter and Volume Envelope Gate Sources). The MIDI CLOCK DIVIDER function creates a new clock signal based on the incoming MIDI clock. The divider has 96 values, with 48 divisions per beat. Using the clock divider values shown below, you can create specific rhythms:

96 = half note = 2 beats of the MIDI Clock signal
72 = dotted quarter note = 1½ beats of the MIDI Clock signal
48 = quarter note = 1 beat of the MIDI Clock signal
36 = dotted eighth note = ¾ of a beat of the MIDI Clock signal
24 = eighth note = ½ of a beat of the MIDI Clock signal
16 = triplet eighth note = 1/3 of a beat of the MIDI Clock signal
12 = sixteenth note = ¼ of a beat of the MIDI Clock signal

6.2 SOUND CATEGORY



SOUND CATEGORY allows you to assign the current preset to one of 32 pre-defined sound categories. This function is intended to assist in organizing presets for quick identification when auditioning sounds. This is especially useful in conjunction with the Voyager Editor/Librarian software.

The assignable sound categories are:

- Not Assigned
- Piano
- Organs
- Strings
- Clav
- Pads
- Soft Lead
- Bright Lead
- Res Lead
- Sync
- Brass
- Horn
- Instruments
- Evolution
- Motion
- Interval
- Synth
- Vox
- Bells
- Sequence
- Percussion
- Model D
- Classic
- Generic
- Harmonics
- Ring
- Noise
- Soft Bass
- Bright Bass
- Res Bass
- Sub Bass
- Sound FX.

The preset sound categories only appear on the bottom line of the display when 'CATEGORY' is selected in the Help/Category menu in Panel Mode. For more information, refer to the 'HELP/CATEGORY' function in Panel Mode (see page 48).

6.3 PRESET NAME

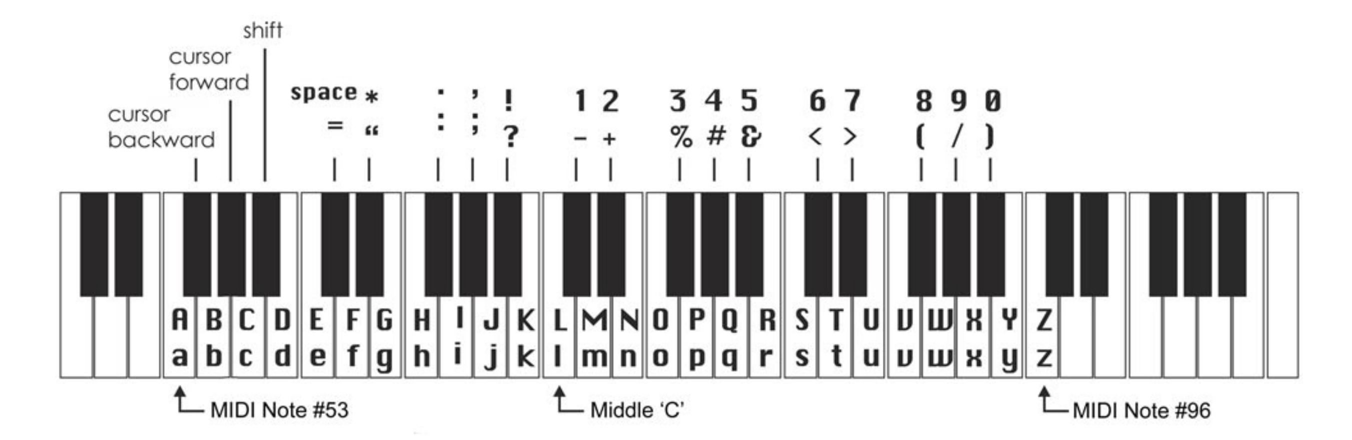


PRESET NAME allows the you to assign a name to a preset. Preset names contain up to 24 characters on two twelve-character lines. Characters are selected by moving the cursor arrow to the desired character location with the **CURSOR** button and scrolling through the character list using the **-1/+1** buttons. Each press of the **CURSOR** button moves the cursor arrow one character position to the right, moving first across the top row and then across the bottom row. When the cursor arrow reaches the last character position, it wraps back to the first character position. At any time, you can use the **ENTER** button to return the cursor arrow to the first character position.

The available characters are:

<space> ! " # $ % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z [\ ] ^_ ` a b c d e f g h I j k l m n o p q r s t u v w x y z { | } ~

MIDI Note ONs can also be used to name Presets. Forty four keys on the Voyager XL keyboard (MIDI Note numbers 53-96) address all of the available letter, number and punctuation characters as shown below. The SHIFT key toggles between uppercase and lowercase characters.



6.4 SAVE PRESET



The SAVE PRESET function allows you to store all of the current front panel settings and software parameters to one of the available 896 memory locations.

To save a preset, you must specify the bank (A-G) and the memory location (1-128). These parameters appear on the top of the LCD display as shown, along with two destination parameters (PANEL and EDIT).

The destination parameters PANEL and EDIT call up convenient default memory locations. When PANEL is selected, the bank and memory location will default to the current Preset location. For example if you are editing preset number 2 in bank B, the default PANEL memory location is preset 2 in bank B as shown.



When EDIT is selected, the bank and memory location defaults to the last saved location. For example, if the last saved location is G009, the default EDIT memory location will be G009 as shown. Note also that the name of the Preset that is stored at the specified memory location is always displayed, preventing you from accidently overwriting a special preset.

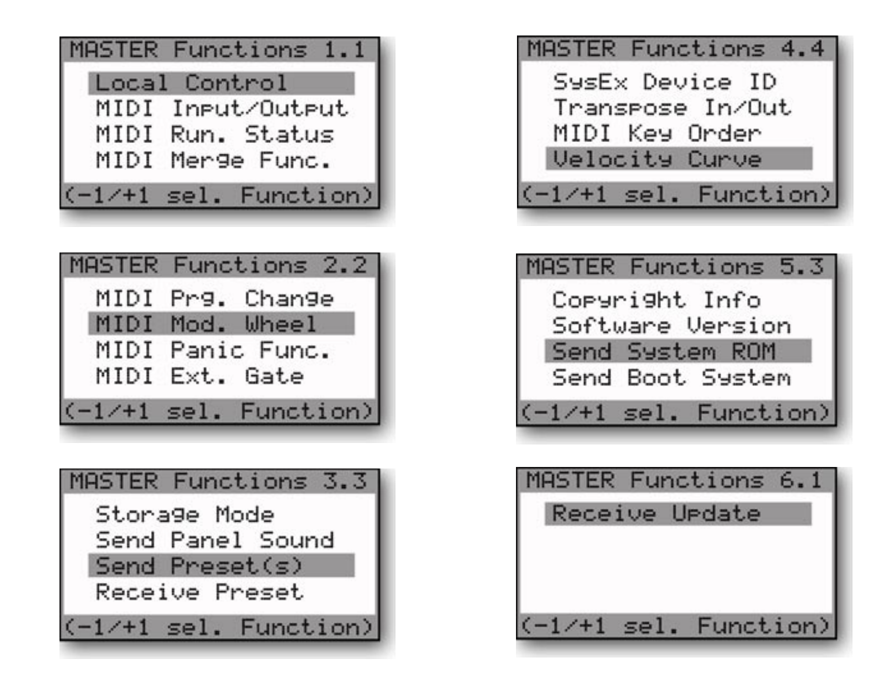


The **CURSOR** button is used to move amongst the destination, bank number, and memory location parameters, and the **-1/+1** buttons are used to select the parameter values. When the desired storage location has been selected, press **ENTER**. The display will then prompt you for a confirmation (YES or NO). Use the **CURSOR** button to select 'YES' and press **ENTER**. The Preset will then be stored at the selected location. Note that changes made to a preset by MIDI CCs are NOT saved.

Master Mode

Master Mode is used to access Voyager XL global parameters and the routines sending and receiving data. Press the **MASTER** button to enter Master Mode. To select a Master Mode function, use the **-1/+1** buttons to scroll to the desired function and then press **ENTER.**

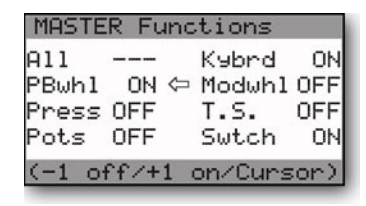
The Voyager XL has 21 Master Mode functions that span six pages as shown.



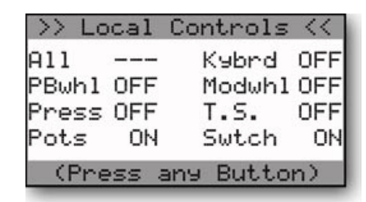
Voyager XL MASTER Menus

Here are the Master Mode functions:

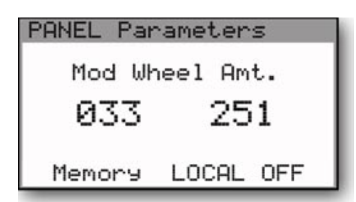
LOCAL CONTROL:



The LOCAL CONTROL menu provides Local ON/OFF control of seven Voyager XL functions: Pitch Bend Wheel (PBwhl), Mod Wheel (Modwhl), Aftertouch (Press), Panel Knobs (Pots), Panel Switches (Swtch), and Touch Surface (T.S.). An eighth selection (All), allows you to switch the Local control of all seven functions at once. To change the status of any Voyager control function, use the **CURSOR** to make a selection and press the **+1/-1** buttons to select ON/OFF. When all changes have been made, press **ENTER** to enter the changes. To escape at any time without changes, press **MASTER.**

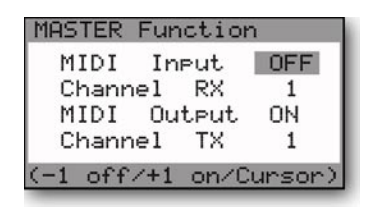


When Local Control of any interface is switched OFF, the Voyager XL will display a 'Local Controls' message upon power-up, showing the status of all controls. To dismiss the message, press any button.



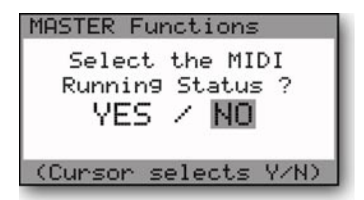
When Local Control of Pots or Switches is set to OFF, and the Voyager XL is set to display parameter values, the LCD will display a 'LOCAL OFF' message when you adjust those controls. For example, if Local Control of Pots has been switched OFF and you then adjust the Mod Wheel Buss **AMOUNT** control (or any other Pot), the LCD will include a 'LOCAL OFF' message on the bottom line of the display as shown.

MIDI INPUT/OUTPUT:



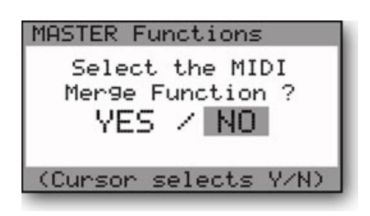
This function is used to set the Voyager XL MIDI IN and MIDI OUT channels, and turn the channels ON or OFF. Use the **CURSOR** to select the parameter, then use the **-1/+1** buttons to change the values.

MIDI RUN STATUS



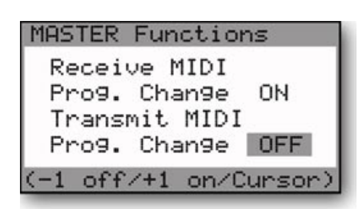
The MIDI RUN STATUS (MIDI Running Status) function is used to reduce the MIDI data sent when a number of MIDI messages with the same Status Byte are sent. When enabled, the Running Status function eliminates the Status Byte. Some MIDI devices can handle MIDI Running Status and some can't, so you have an option of turning this on ('YES') or off ('NO'). To change the setting, use the **CURSOR** to highlight the desired choice and press **ENTER**.

MIDI MERGE FUNC.



When enabled ('YES'), the MIDI Merge function passes incoming MIDI Note ON and Note OFF messages from the MIDI In jack to the MIDI Out jack. When this function is disabled ('NO'), only MIDI events created by the instrument appear at the MIDI Out. To change the setting, use the **CURSOR** to highlight the desired choice and press **ENTER**.

MIDI PRG. CHANGE



The MIDI PRG CHANGE (MIDI Program Change) function allows you to enable (ON) or disable (OFF) the reception and transmission of MIDI program changes. To change the setting, use the **CURSOR** to highlight the desired parameter, and then use the **-1/+1** buttons to change the setting.



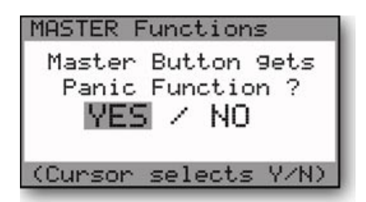
When Receive MIDI Program Change is ON, the Voyager XL will accept both MIDI Program Change and MIDI Bank Select messages. When this function is OFF, the Voyager XL will ignore these messages. In either case, the MIDI LED on the Interface Panel will blink when a MIDI message is received on the proper channel.

MIDI MOD. WHEEL



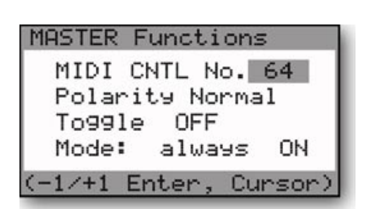
The MIDI Modulation Wheel function allows you to select the transmission of 7-bit or 14-bit MIDI Control Change (CC) messages from the Mod Wheel. Use the **-1/+1** buttons to change the setting. In 7-bit mode, only MIDI CC1 is sent when the Mod Wheel is moved. In 14-bit mode, both MIDI CC1 (Most Significant Byte (MSB)) and MDI CC33 (Least Significant Byte (LSB)) are sent when the Mod Wheel is moved.

MIDI PANIC FUNC. (MIDI Panic Function)



The MIDI Panic Function selects whether or not to issue a MIDI 'All Notes Off' message when the **MASTER** switch is pressed. To change the setting, use the **CURSOR** to highlight the desired choice and press **ENTER**.

MIDI EXT. GATE (MIDI External Gate)



The MIDI External Gate menu allows you assign MIDI functions to a footswitch plugged into the **ENV GATE** jack. The menu allows you to assign a MIDI control number (MIDI CNTL No.), set the function polarity (POLARITY), the toggle status (TOGGLE), and the gate mode (MODE). The assignable options for these parameters are listed below

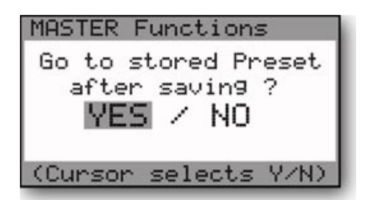
MIDI CNTL NO: The MIDI Continuous Controller number that is output when the footswitch is engaged. Assignable controller numbers are 1-127.

POLARITY: This sets the polarity of the MIDI footswitch function. When set to NORMAL, a value of 127 is transmitted when the footswitch is pressed, and a value of 0 when the footswitch is released. When set to INVERSE, the values are reversed.

TOGGLE: When set to ON, the footswitch function responds like a toggle switch (press once = ON, press again = OFF). When set to OFF, the footswitch function responds like momentary switch (press = ON, release = OFF)

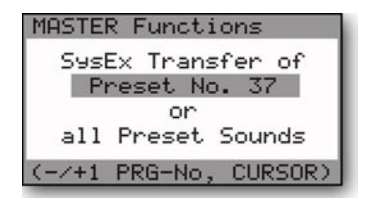
MODE: Determines the condition when this function is active:
ALWAYS ON: The function is always active
ALWAYS OFF: The function is not active
ENV-SW ON: The function is active when the Voyager XL ENV GATE switch is set to 'ON/EXTERNAL'
ENV-SW OFF: The function is active when the Voyager XL ENV GATE switch is set to 'KEYBOARD'

STORAGE MODE



The Storage Mode function sets the behavior after a preset is stored. If YES is chosen, then the preset is stored to the new location and the interface goes to that new location. If NO is chosen, then the current location is maintained after the preset is stored. To change the setting, use the **CURSOR** to highlight the desired choice and press **ENTER**.

SEND PRESET(S)



SEND PRESET(S) is a utility to send SysEx data for archiving a single preset ('PRESET NO. X') or a complete bank of 128 presets ('ALL PRESET SOUNDS'). Use the **CURSOR** to select either the single preset or bank option. If the single preset option is selected, the **-1/+1** buttons are used to specify the preset number. Only presets from the current bank can be selected.

The SEND PRESET(S) utility requires another Voyager, or a computer with a MIDI interface and a program that can accept a manual SysEx dump. You must enable the device that is to receive the SysEx data. Once the remote device is enabled, press **ENTER** to start the data transfer. When the transfer begins, the Voyager will display a 'SYSTEM EXCLUSIVE DATA IN PROGRESS' message on the LCD. When the data transfer operation is complete, the LCD will return to the Master Mode menu.



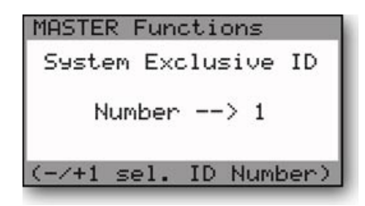
Although the SEND PRESET(S) and SEND PANEL SOUND utilities perform similar functions, they are not the same. The difference is that if a single preset is saved using SEND PRESET(S), the storage location of that preset is also saved, but with SEND PANEL SOUND it is not. This means that if you select and save Preset 37 in SEND PRESET(S), that preset will load back into memory location 37 of the current bank when restored, overwriting the preset stored there. If the same preset is saved using SAVE PANEL SOUND, Preset 37 will reload into buffer of the current preset, allowing you to audition the sound without overwriting the preset at that location.

RECEIVE PRESETS



The RECEIVE PRESETS function enables or disables System Exclusive reception on the Voyager XL. When enabled, the Voyager XL will receive all SysEx preset and bank data. When disabled, the Voyager XL will ignore all incoming SysEx messages. To make a change to this menu, use the **-1/+1** buttons to switch between enabled and disabled, and press **ENTER.** Note that the setting of RECEIVE PRESET has no effect on outgoing SysEx data; the Voyager will always transmit SysEx messages when the SEND PRESET or SEND PANEL SOUND functions are used.

SYSEX DEVICE ID

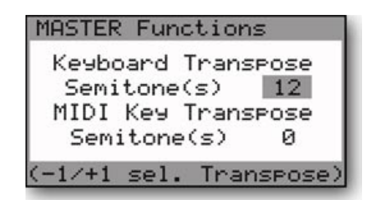


The SYSEX DEVICE ID function is intended for situations when several Voyagers (Performer, Electric Blue, RME, XL, etc.) are used in a setup. By assigning a unique Device ID number, each Voyager will transmit and respond only to specific SysEx messages. This allows you to send presets or banks to a specific Voyager within the group. To change the SysEx Device ID number, use the **-1/+1** buttons to select a number between 1 and 128 and press **ENTER**.



SysEx messages include a Device ID byte. When you change the Voyager's Device ID number, all SysEx messages sent from the Voyager will include this new value in the Device ID byte. If that SysEx message is sent back to several Voyagers, only the Voyager that has matching Device ID will receive the message, all others will ignore it.

TRANSPOSE IN/OUT

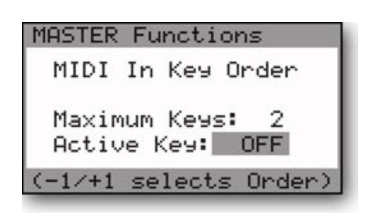


The TRANSPOSE IN/OUT function is used for transposing MIDI Notes received and/or the notes generated by the Voyager XL keyboard. The 'Keyboard Transpose Semitones' parameter allows you to transpose keyboard notes up to 24 semitones up (two octaves) or 48 semitones down (four octaves). The 'MIDI Key Transpose Semitones' parameter allows you to transpose the number the MIDI notes received by the Voyager up to 48 semitones up or 48 semitones down (plus or minus four octaves). Use the **CURSOR** button to move between the Keyboard and MIDI key Transpose parameters, and use the **-1/+1** buttons to select the number of semitones you wish to transpose up or down.



Transposition values are not remembered on power down.

MIDI KEY ORDER

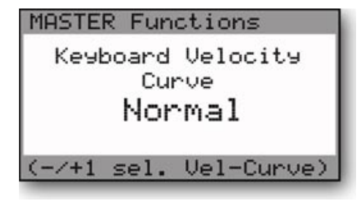


MIDI KEY ORDER allows multiple Voyagers to function together as a polyphonic synth stack controlled from a single master controller. Up to 16 Voyagers can be linked together to create a 16-voice synth. To define the number of Voyagers in a polyphonic setup, set the MAXIMUM KEYS parameter to the number of Voyagers in your setup, then configure each Voyager for a different voice number using the ACTIVE KEY parameter. For example, if you have 3 Voyagers in your setup, each should be set for 'MAXIMUM KEYS: 3', and the first Voyager should be set for 'ACTIVE KEY: 1', the second 'ACTIVE KEY: 2', and the third 'ACTIVE KEY: 3'. Use the **CURSOR** to select the MIDI Key Order parameters and use the **-1/+1** buttons to select the values.



You can use any combination of Voyager/Little Phatty/Slim Phatty synths to create a polyphonic synth stack. For information on configuring an LP or SP to function in a polyphonic arrangement, consult the User's Manual for those instruments.

VELOCITY CURVE



The VELOCITY CURVE function allows you to tailor the velocity response to your playing style. The Voyager XL offers three velocity curves: SOFT, NORMAL , and HARD. SOFT achieves high velocity values with a light touch. NORMAL is the unprocessed velocity curve of the Voyager XL Keyboard. HARD requires a heavy touch to achieve high velocity values. To change this setting, use the **-1/+1** buttons to select the desired Velocity Curve.

COPYRIGHT INFO/ FACTORY SETUP MENU

MASTER Functions
Copyright 2002-2010
Moog Music Inc.
by Rudi Linhard
www.lintronics.de
(Press any Button)

The COPYRIGHT INFO screen shows the copyright dates, as well as the creator of the Voyager’s operating system, Rudi Linhard. This is also the entry page to the Factory Setup menus – simply press the **+1** button to view the Factory Setup Menu.

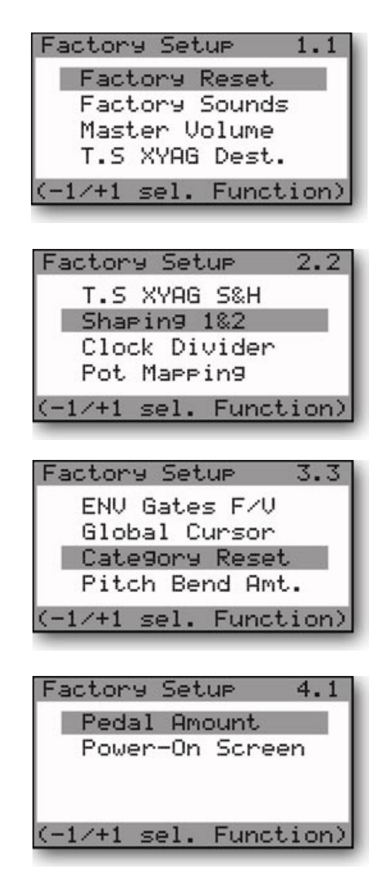
The Factory Setup menus are used to restore various Voyager XL parameters to factory default values. Descriptions of each Factory Setup menu follow. While working with the Factory Setups, you can press **MASTER** anytime to return to the Master Mode Menu.



From the COPYRIGHT INFO screen, pressing the “-1” button will display an animated view of credits.

Factory Setup Menus

The Factory Setup menus, span four pages as shown:



The Voyager XL Factory Setup Menus

1.1 FACTORY RESET



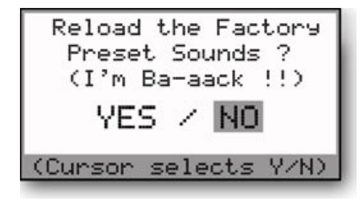
The FACTORY RESET function resets the Voyager PANEL and MASTER functions to the default factory state (see list of default values below). To reset the PANEL and MASTER functions select 'YES' and press **ENTER.** To escape without restoring the Factory presets, select 'NO' and press **ENTER**.

REF	PANEL FUNCTIONS	DEFAULT
1.1	Quick Mode	+/- BUTTONS = NO EXT AUDIO POT = YES
1.2	Parameter Display	3 SEC
1.3	Master Volume	NO
1.4	Headphone Volume	NO
2.1	T.S. Reduction	NO
2.2	Real Panel Parameters	NO
2.3	Help/Category	YES
2.4	LCD Contrast	0

REF	MASTER FUNCTIONS	DEFAULT
1.1	Local Control	ALL ON
1.2	MIDI Input/Output	IN = 1 OUT = 1
1.3	MIDI Run. Status	NO
1.4	MIDI Merge Func.	NO
2.1	MIDI Prg. Change	RECEIVE = ON TRANSMIT = ON
2.2	MIDI Mod, Wheel	7 BIT
2.3	MIDI Panic Func.	NO
2.4	MIDI Ext. Gate	MIDI CNTL NO = 64 POLARITY = NORMAL TOGGLE = OFF MODE = ALWAYS ON
3.1	Storage Mode	NO
3.2	Send Panel Sound	-
3.3	Send Preset(s)	-
3.4	Receive Preset	SYSEX ENABLED
4.1	SysEx Device ID	1
4.2	Transpose In/Out	KYBD = 0 MIDI = 0
4.3	MIDI Key Order	MAX = 2 ACTIVE = OFF
4.4	Velocity Curve	NORMAL
5.1	Copyright Info	-
5.2	Software Version	-
5.3	Send System ROM	-
5.4	Send Boot System	-
6.1	Receive Update	-

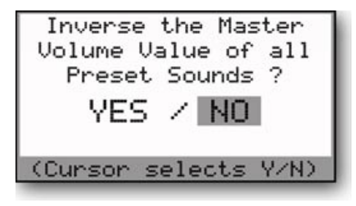
Voyager XL Default Settings

1.2 FACTORY SOUNDS



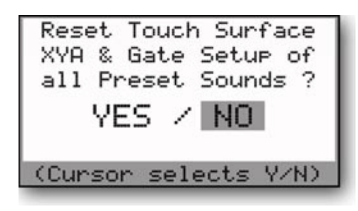
The FACTORY SOUNDS function restores the Voyager XL to its default factory state. Performing this function will replace the current bank with the standard Voyager Performer Edition Preset Bank, so don't do this unless you are sure you want to. To restore the factory presets select 'YES' and press **ENTER.** To escape without restoring the Factory presets, select 'NO' and press **ENTER.**

1.3 MASTER VOLUME



The MASTER VOLUME function is used to invert the stored Master Volume values of the Voyager XL Presets. This can be useful if you have a bank with all Master Volume values set to '0'; this function will change all Preset Volumes to their maximum value. To perform this function, use the **CURSOR** to select 'YES' and press **ENTER.** To left this menu without changes, select 'NO' and press **ENTER**.

1.4 T.S. XYAG DEST.

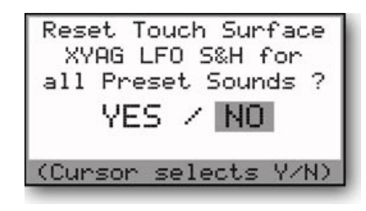


The T.S. XYAG DESTINATION function is used to restore the default parameters of the Touch Surface destinations, MIDI CC values, direction of control, and amounts for the X, Y, and Area axes as well as the Touch Surface Gate. The default values are:

TS-X: Filter Cutoff MIDI CC: Off Direction: Normal Amount: 50%	TS-A: Filter Resonance MIDI CC: Off Direction: Normal Amount: 50%
TS- Y: Filter Spacing MIDI CC: Off Direction: Normal Amount: 50%	Gate: No switch MIDI CC: 88 Polarity: Normal

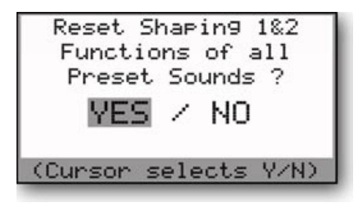
To restore the T.S. XYAG Destination defaults , use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER**.

2.1 T.S. XYAG S&H (Touch Surface XYAG Sample & Hold)



The T.S. XYAG S&H function sets the Touch Surface LFO Sample & Hold parameter to "OFF" for all Presets in the current bank (other banks are not affected). To reset the T.S. XYAG S&H, select 'YES' and press **ENTER.** To escape without changes, select 'NO' and press **ENTER.**

2.2 SHAPING 1&2

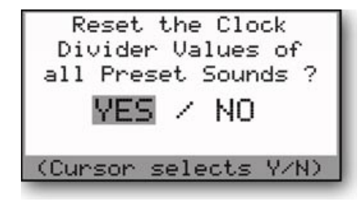


The SHAPING 1&2 function restores the default settings for the Programmable Mod Buss Shaping Sources. The defaults for both sources are:

Shaping Source: Fixed Value
Offset Value (High): 0
Offset Value (Low): 0

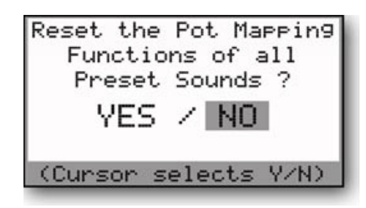
To restore the Shaping Source default values, use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER**.

2.3 CLOCK DIVIDER



The CLOCK DIVIDER function restores the default settings for the clock divider parameter stored in the presets. The default value is 24, which is an 8th note (half a beat). To restore the clock divider values to their defaults, , use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER.**

2.2 POT MAPPING



The POT MAPPING function restores the default settings for the Pot Mapping parameters stored in the presets. The default values are:

Map 1-
SRC: Mod Wheel
Dest: Pedal Amt
Direction: Normal
Amount: 50%

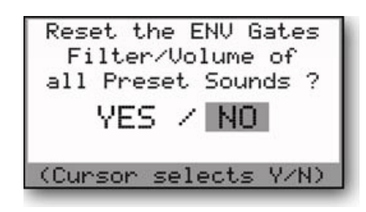
Map 2 -
SRC: Key Pitch
Dest: Fil Spacing
Direction: Inverse
Amount: 50%

Map 3 -
SRC: Mod Wheel
Dest: Fil Spacing
Direction: Normal
Amount: OFF

Map 4 - MOD 1
SRC: Key Pitch
Dest: Fil Cutoff
Direction: Normal
Amount: OFF

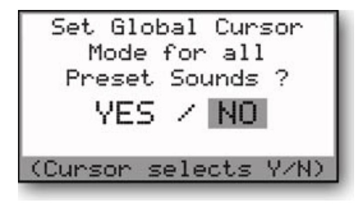
To restore the Pot Mapping default values, use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER.**

3.1 ENV GATES F/A (Envelope Gates Filter/Volume)



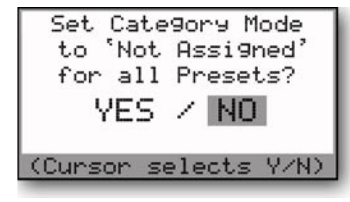
The ENV GATES F/A function restores the default settings for the Filter and Amplitude Envelope Gates parameters stored in the presets. The default is ENV GATE INPUT for both. To restore the default Envelope gate settings, use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER.**

3.2 GLOBAL CURSOR



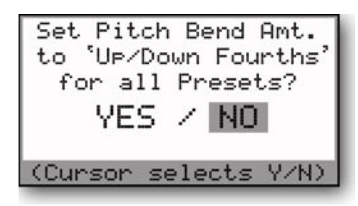
This function is not yet implemented.

3.3 CATEGORY RESET



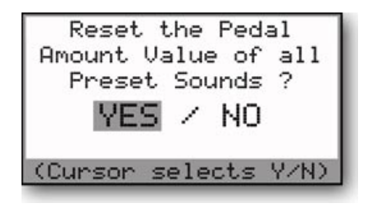
The CATEGORY RESET function sets all preset categories in the current bank to "Not Assigned" (other banks are not affected). To reset the Categories to "Not Assigned", select 'YES' and press **ENTER.** To escape without changes, select 'NO' and press **ENTER.**

3.4 PITCH BEND AMT



The PITCH BEND AMOUNT function sets the Pitch UP and DOWN values to "Fourths" (5 semitones) for all presets in the current bank. To set the Pitch Bend Amount to "Fourths", select 'YES' and press **ENTER.** To escape without changes, select 'NO' and press **ENTER.**

4.1 PEDAL AMOUNT



The PEDAL AMOUNT function resets the Pedal/ON Amount to 0 (zero) for all presets in the current bank (other banks are not affected). To reset the Pedal/ON Amount, select 'YES' and press **ENTER.** To escape without changes, select 'NO' and press **ENTER.**

4.2 POWER-ON SCREEN



The POWER-ON SCREEN function allows you to select the original Voyager Power-on logo or the new XL Power-on logo. To change the appearance of the Power-on screen, use the **CURSOR** to select 'YES' and press **ENTER.** To leave this menu without changes, select 'NO' and press **ENTER**.

SOFTWARE VERSION

MASTER Functions
System Version 3.6
Release 09/26/10
Boot Version 3.6
www.moogmusic.com
(Press any Button)

The SOFTWARE VERSION screen displays the current Operating System ROM and BOOT ROM versions and date of the release.



When the software version screen is displayed, pressing the CURSOR button will display the current Pitch Bend and Mod Wheel values.

SEND SYSTEM ROM

MASTER Functions
Press ENTER to send
Program ROM Data of
Bank A
(Prog ROM Ver 3.3)

The SEND SYSTEM ROM utility allows you to back up your operating system via SysEx data. This utility requires a computer with a MIDI interface and a program that can accept a manual SysEx dump. You must enable the program that is to receive the SysEx data. Once the program is enabled, press **ENTER** to start the data transfer. When the transfer begins, the Voyager will display a 'SYSTEM EXCLUSIVE DATA IN PROGRESS' message on the LCD along with a progress bar. When the data transfer is complete, the Voyager LCD will prompt you to transfer the next bank (Bank C). Enable your SysEx program again and then press **ENTER**. When the transfer is complete, the LCD will return to the Master Mode menu.

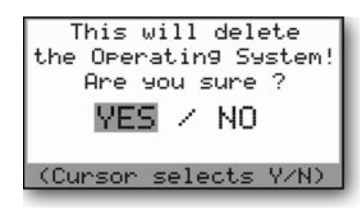
SEND BOOT SYSTEM

MASTER Functions
Press ENTER to send
BOOT System Data of
Bank B
(Boot ROM Ver 3.3)

The SEND BOOT SYSTEM utility allows you to back up your boot software via SysEx data. This utility requires a computer with a MIDI interface and a program that can accept a manual SysEx dump. You must enable the program that is to receive the SysEx data. Once the program is enabled, press **ENTER** to start the data transfer. When the transfer begins, the Voyager will display a 'SYSTEM EXCLUSIVE DATA IN PROGRESS' message on the LCD. When the data transfer is complete, the LCD will return to the Master Mode menu.

RECEIVE UPDATE

The RECEIVE UPDATE utility allows you to upgrade the Voyager XL Operating System. Updates are available from our website (www.moogmusic.com) and are found in Minimoog Voyager ‘Software’ section. Instruction for installing the software is provided with the files – please follow these instructions carefully!



When you select RECEIVE UPDATE from the Master Mode menu and hit **ENTER**, the Voyager XL will display a message about deleting the operating system as shown. This is first step in the update. If you are certain you wish to proceed, use the **CURSOR** to select ‘YES’ and press **ENTER**. The LCD will briefly display an ‘ERASING FLASH ROM’ message.

Waiting for
System Exclusive
Data Transfer of

Bank A,B,C or D
(Cursor aborts SysEx)

A new display will then appear, similar to the one shown at left. When you see this screen, the Voyager XL has been enabled to receive the first operating system update file. Follow the instructions provided with the update to send the correct files to the Voyager XL in the proper order. As each file is sent, the Voyager XL will display a ‘SYSTEM EXCLUSIVE DATA IN PROCESS’ message. Follow the instructions to send additional files until the update process is complete. The new operating system does not become active until all SysEx data transfers are confirmed as successful.



System Exclusive (SysEx) data transfers to/from the Voyager XL require:

- A computer with Internet access and a MIDI interface.
- MIDI Software capable of sending a generic Sysex bank file (.syx) or Standard MIDI file (.mid)

Many software sequencers are capable of opening SysEx files and sending SysEx data. If you do not own a sequencer, or if your sequencer doesn’t support SysEx data transfers, there are MIDI utility software programs that will send and receive SysEx data files. For the PC, try ‘MIDI-OX’, available online at www.midiox.com. For the Macintosh, try ‘SysEx Librarian’, available at www.snoize.com.

You can also use Standard MIDI files to update the Voyager OS. Many sequencers will import Standard MIDI file versions (.mid). If you decide to perform the update using Standard MIDI files on a sequencer, however, be sure you understand fully the settings that may affect the transmission of this type of data. It is beyond the scope of this manual to explain how to import or open files containing System Exclusive data in the many different MIDI programs available – it is your responsibility to know and be familiar with this aspect of the upgrade! If you have questions about your software’s capabilities to send large SysEx messages in either file format (.syx or .mid), contact your software vendor.

If you do not own a computer, special arrangements will need to be made for software upgrades. Please contact techsupport@moogmusic.com for more information.

How the Voyager XL handles MIDI

When you adjust any one of the Voyager XL front panel controls, MIDI Continuous Controller (CC) messages are transmitted on the MIDI Out jack. The information contained in these MIDI CC messages depends on the parameter to which each panel control is assigned. For example, when the **FILTER CUTOFF** control is adjusted, MIDI CC data corresponding to the Filter Cutoff parameter (CC#19 & CC#51) is transmitted.

The chart below lists the MIDI CC data assignments associated with each panel control.

SECTION	CONTROL	FUNCTION	CC	VALUE/RANGE
Modulation Busses	MW SOURCE	Selects the Mod Wheel bus source modulation	68	0-15 = Tri 16-31 = Square 32-47 = Osc 3 48-63 = S&H 64-79 = ON/Mod2 80-127 = Noise/PGM
	MW DESTINATION	Selects the Mod Wheel bus destination	69	0-15 = Pitch 16-31 = Osc 2 32-47 = Osc 3 48-63 = Filt 64-79 = Wave 80-127 = LFO Rate/PGM
	MW SHAPING	Selects the Mod Wheel bus modulation shaping	70	0-31 = Filt 32-63 = Velocity 64-95 = Aftertouch 96-127 = ON/PGM
	MW AMOUNT	Adjusts the Mod Wheel bus modulation amount	6 MSB, 38 LSB	-
	PEDAL SOURCE	Selects the Pedal/ON bus source modulation	71	0-15 = Tri 16-31 = Square 32-47 = Osc 3 48-63 = S&H 64-79 = ON/Mod2 80-127 = Noise/PGM
	PEDAL DEST.	Selects the Pedal/ON bus destination	72	0-15 = Tri 16-31 = Square 32-47 = Osc 3 48-63 = S&H 64-79 = ON/Mod2 80-127 = Noise/PGM
	PEDAL SHAPING	Selects the Pedal/ON bus modulation shaping	73	0-31 = Filt 32-63 = Velocity 64-95 = Aftertouch 96-127 = ON/PGM
	PEDAL AMOUNT	Adjusts the Pedal/ON bus modulation amount	8 MSB, 40 LSB	-

Voyager XL MIDI CC data assignments

SECTION	CONTROL	FUNCTION	CC	VALUE/RANGE
Performance Controls	MOD WHEEL	Modulation	1 MSB, 33 LSB	-
	GLIDE SWITCH	Turns Glide ON/OFF	65	0-63 OFF, 64-127 ON
	RELEASE SWITCH	Turns Release ON/OFF	88	0-63 OFF, 64-127 ON
	MOD 1	Mod 1 Input	2 MSB, 34 LSB	-
	MOD 2	Mod 2 Input	4 MSB, 36 LSB	-
LFO	LFO RATE	Adjusts the LFO frequency	3 MSB, 35 LSB	0 – 127
	LFO SYNC	Selects the LFO Sync mode	67	0-31 = OFF 32-63 = MIDI 64-95 = KB 96-127 = Env Gate
LFO2	LFO2 MASTER RATE	Adjusts the LFO2 Master frequency	92	0 – 127
	LFO2 MASTER RANGE	Selects the LOW or HIGH range for the LFO2 Master	93	0-63 LOW, 64-127 HIGH
	LFO2 MASTER CLOCK DIVISION	Establishes the CLOCK DIVISION parameter for LFO2 MASTER	94	See LFO2 Clock Divider table, pg. 82
	LFO2 MASTER WAVEFORM	Selects the LFO2 Master waveform. This MIDI parameter duplicates the panel waveform selections and adds a sine wave option. It also provides future expansion for additional waveforms.	95	0-15 = TRIANGLE 16-31 = SQUARE 32-47 = RAMP 48-63 = SAW 64-79 = S&H 80-95 = S&H SMOOTH 96-111 = SINE (MIDI only) 112-127 = FUTURE USE
	LFO2 (+) RATE	Adjusts the LFO (+) output frequency independent of the Master setting	102	0 – 127
	LFO2 (+) RANGE	Adjusts the LFO (+) output range independent of the Master setting	103	0-63 LOW, 64-127 HIGH
	LFO2 (+) CLOCK DIVISION	Establishes an independent CLOCK DIVISION parameter for the LFO2 + output	104	See LFO2 Clock Divider table, pg. 82
	LFO2 (+) WAVEFORM	Establishes an independent waveform selection for the LFO2 + output	105	Same values as LFO2 MASTER WAVEFORM
	LFO2 (-) RATE	Adjusts the LFO (-) output frequency independent of the Master setting	106	0 – 127
	LFO2 (-) RANGE	Adjusts the LFO (-) output range independent of the Master setting	107	0-63 LOW, 64-127 HIGH
	LFO2 (-) CLOCK DIVISION	Establishes an independent CLOCK DIVISION parameter for the LFO2 - output	108	See LFO2 Clock Divider table, pg. 82
	LFO2 (-) WAVEFORM	Establishes an independent waveform selection for the LFO2 - output	109	Same values as LFO2 MASTER WAVEFORM

Voyager XL MIDI CC data assignments

SECTION	CONTROL	FUNCTION	CC	VALUE/RANGE
Oscillators	OSC 1 OCTAVE	Sets the octave of oscillator 1	74	0-15 = 32' 16-31 = 16' 32-47 = 8' 48-63 = 4' 64-79 = 2' 80-127 = 1'
	OSC 1 WAVE	Sets the waveform of oscillator 1	9 MSB, 41 LSB	-
	OSC 2 FREQ	Adjusts the frequency of oscillator 2	10 MSB, 42 LSB	-
	OSC 2 OCTAVE	Sets the octave of oscillator 2	75	0-15 = 32' 16-31 = 16' 32-47 = 8' 48-63 = 4' 64-79 = 2' 80-127 = 1'
	OSC 2 WAVE	Sets the waveform of oscillator 2	11 MSB, 43 LSB	-
	OSC 3 FREQ	Adjusts the frequency of oscillator 3	12 MSB, 45 LSB	-
	OSC 3 OCTAVE	Sets the octave of oscillator 3	76	0-15 = 32' 16-31 = 16' 32-47 = 8' 48-63 = 4' 64-79 = 2' 80-127 = 1'
	OSC 3 WAVE	Sets the waveform of oscillator 3	13 MSB, 45 LSB	-
	1-2 SYNC	Turns oscillator sync ON/OFF	77	0-63 OFF, 64-127 ON
	3-1 FM	Turns oscillator frequency modulation ON/OFF	78	0-63 OFF, 64-127 ON
	3 KB CONT	Turns keyboard control of oscillator 3 ON/OFF	79	0-63 OFF, 64-127 ON
	3 FREQ	Sets the HI/LO frequency range of oscillator 3	80	0-63 OFF, 64-127 ON
	GLIDE RATE	Adjusts the rate of glide	5 MSB, 37 LSB	-
Mixer	EXTERNAL (see NOTE)	Adjusts the level of the external audio signal	14 MSB, 46 LSB	-
	EXTERNAL SWITCH	Toggles the external audio ON/OFF	81	0-63 OFF, 64-127 ON
	OSCILLATOR 1	Adjusts the level of oscillator 1	15 MSB, 47 LSB	-
	OSCILLATOR 1 SW	Toggles oscillator 1 ON/OFF	82	0-63 OFF, 64-127 ON
	OSCILLATOR 2	Adjusts the level of oscillator 2	16 MSB, 48 LSB	-
	OSCILLATOR 2 SW	Toggles oscillator 2 ON/OFF	83	0-63 OFF, 64-127 ON
	OSCILLATOR 3	Adjusts the level of oscillator 3	17 MSB, 49 LSB	-
	OSCILLATOR 3 SW	Toggles oscillator 3 ON/OFF	84	0-63 OFF, 64-127 ON
	NOISE	Adjusts the level of noise	18 MSB, 50 LSB	-
	NOISE SWITCH	Toggles noise ON/OFF	85	0-63 OFF, 64-127 ON

Voyager XL MIDI CC data assignments



When the EXTERNAL SWITCH is set to OFF, the EXTERNAL control does not transmit MIDI CC's.

SECTION	CONTROL	FUNCTION	CC	VALUE/RANGE
Filter	CUTOFF	Adjusts the filter cutoff frequency	19 MSB, 51 LSB	-
	SPACING	Adjusts the filter spacing parameter	20 MSB, 52 LSB	-
	RESONANCE	Adjusts the filter resonance parameter	21 MSB, 53 LSB	-
	KB AMOUNT	Adjusts the amount of pitch CV affecting the cutoff	22 MSB, 54 LSB	-
	MODE	Toggles the filter mode between LP/LP and HP/LP	86	0-63 OFF, 64-127 ON
Envelope Generator	FILTER ENV ATTACK	Adjusts the filter envelope attack time	23 MSB, 55 LSB	-
	FILTER ENV DECAY	Adjusts the filter envelope decay time	24 MSB, 56 LSB	-
	FILTER ENV SUSTAIN	Sets the filter envelope sustain level	25 MSB, 57 LSB	-
	FILTER ENV RELEASE	Adjusts the filter envelope release time	26 MSB, 58 LSB	-
	AMOUNT TO FILTER	Adjusts the amount of filter envelope affecting the cutoff	27 MSB, 59 LSB	-
	VOLUME ENV ATTACK	Adjusts the volume envelope attack time	28 MSB, 60 LSB	-
	VOLUME ENV DECAY	Adjusts the volume envelope decay time	29 MSB, 61 LSB	-
	VOL ENV SUSTAIN	Sets the volume envelope sustain level	30 MSB, 62 LSB	-
	VOL ENV RELEASE	Adjusts the volume envelope release time	31 MSB, 63 LSB	-
	ENV GATE SWITCH	Toggles the envelope gate between Keyboard and ON/EXT	87	0-63 OFF, 64-127 ON
Vol	MASTER VOLUME	Adjusts the master volume level	7 MSB, 39 LSB	-

Voyager XL MIDI CC data assignments

LFO2 CLOCK DIVIDER

The LFO2 Clock Divider parameter can be set to one of 20 different values. The divisor is based on 24 clocks per quarter note (the MIDI standard). The table below shows how the number of MIDI clocks relates to musical time values, along with the MIDI CC value that selects the desired time value. The default clock divider value is 1/4 (= 24 clocks/quarter note).

CLOCKS/QUARTER NOTE	TIME VALUE	MIDI CC VALUE
1	1/64 note	122 - 127
2	Dotted 1/64 note	116 - 121
3	1/32 note	110 - 115
4	Dotted 1/32 note	104 - 109
6	1/16 note	98 - 103
8	1/8 note triplet	92 - 97
9	Dotted 1/16 note	86 - 91
12	1/8 note	80 - 85
16	1/4 note triplet	74 - 79
18	Dotted 1/8 note	68 - 73
24	**Quarter note**	**61 - 67**
32	Half note triplet	55 - 60
36	Dotted quarter note	49 - 54
48	Half note	44 - 48
64	Whole note triplet	37 - 42
72	Dotted half note	31 - 36
96	Whole note	25 - 30
144	Dotted whole	19 - 24
192	Whole note + whole note	13 - 18
288	3 Wholes	7 - 12
384	4 Wholes	0 - 6

Appendix A - Touch Surface LFO S&H: In Use

The Touch Surface LFO S&H function is a recent addition to the Voyager operating system, adding Sample & Hold capabilities to the Touch Surface. To understand what this function does, try this simple example:

1. Initialize a preset using EDIT Mode Menu 1.3 (Init Parameters).
2. From EDIT Mode Menu 5.1 (T.S. Destinations), select the TSX menu and configure the parameters as follows:
   Destination: Oscillator 1 Octave
   MIDI CNTL No: OFF
   Direction: Normal
   Amount: 100%
   TSX LFO S&H: ON
3. Set the **LFO RATE** control to about 10 'o clock.
4. Touch the Touch Surface and move your finger slowly across the surface on the X axis. You will hear the pitch of Oscillator 1 change instantaneously, not smoothly, at twice the rate of the LFO.

This illustrates the basic concept of the TS LFO S&H function. When the TS LFO S&H is switched ON for TSX, TSY or TSA, it effects all of the assignable control parameters for that axis, including the Destination, MIDI Control Number (1-127), Direction (Normal or Inverted) and Amount (OFF, 25%, 50% and 100%). The TS LFO S&H output also appears on the Touch Surface X, Y, A and GATE outputs of the Modular Patch Panel.

Since the TS LFO S&H function is controlled by the LFO, it means that all of the **LFO SYNC** control settings (MIDI, KY, ENV GATE) apply to the Touch Surface LFO S&H function as well.

To download examples of Presets programmed to use the TS LFO S&H function, go to the Moog Music web site (www.moogmusic.com).



1. By sweeping your finger across the Touch Surface in time with the Sample and Hold rate, you can create precise rhythmic modulations & effects.
2. When an external Control Voltage (CV) signal is applied to the S&H Gate Input on the Voyager back panel, it overrides the LFO as the S&H clock. This configuration allows you to clock the TS S&H independently of the LFO to create non-synchronous S&H/modulation effects.

Appendix B - MIDI Basics

MIDI is an acronym for 'Musical Instrument Digital Interface', an industry-standard protocol for the interconnection and control of electronic musical instruments. Prior to MIDI, instrument manufacturers designed their own systems for connecting devices together (most were CV/gate based), but few of these systems were compatible, which meant that you couldn't easily connect synthesizers from Manufacturer A with those from Manufacturer B. The arrival of MIDI in 1983 simplified the connection process by providing a standard hardware interface and a series of common digital command messages that allow synthesizers, computers, sound cards, drum machines, etc., to control one another. MIDI messages can define musical events, such as notes played, note duration and loudness, or they can specify the exchange of data, such as a single preset, a bank of presets, or even a firmware upgrade.

A typical MIDI message consists of a status byte followed by data bytes. A status byte tells the receiving device what to do with the data that follow the status byte. For instance, a MIDI Note On message will be followed by a byte that states the Note value to be played, followed again by a byte that tells the receiving device what the Velocity of the Note On is (on keyboards, the 'Velocity' parameter is associated with how hard a note is played). Data bytes have 7-bit values (0-127), though two can be sent together, and by defining one as the Most Significant Byte (MSB), and the other as the Least Significant Byte (LSB), 14-bit resolution can be achieved (0-16383).

The MIDI standard categorizes different types of messages into channel messages and system messages. Channel Messages are for things like Note Ons, and other performance information, while System Messages include System Exclusive commands and other global information, such as timing synchronization messages. A single MIDI cable can be used to address up to 16 MIDI Channels. Multiple MIDI Channels are helpful when several MIDI devices are used in a setup, or if a device is multi-timbral. Since the Voyager is both monophonic and mono-timbral, it operates on a single channel for the purpose of sending or receiving MIDI data.

Here are a few basic terms for understanding MIDI:

NOTE ON: This message tells a synthesizer to start a note event. A Note On message specifies the Note Number and Attack Velocity (on a keyboard, how fast the note is pressed) for a single note.

NOTE OFF: This message follows a Note On message and signals the end of that note. It specifies the Note Number and Velocity of the release (on a keyboard, how fast the key is let up).


A MIDI Note On message with a Velocity value of '0' is another way to end a note.

PITCH BEND: Tied most often to the Pitch Bend Wheel of a MIDI keyboard, this message conveys how much that wheel is pushed up or down. Depending on how it is programmed, the synthesizer can turn Pitch Bend information into a change in pitch, modulation, timbre or volume.

AFTERTOUCH: A message that contains information about keyboard pressure sensitivity. Some keyboards have sensors underneath the keys to sense how much you press on the key after you have pushed it down. These sensors generate the raw signals that are turned into Aftertouch Data. Aftertouch is often used is selectively introduce modulation effects such as vibrato, but can also be programmed to bend pitch, change volume or alter filter parameters.

CONTINUOUS CONTROLLER: The Voyager XL is a knob-laden synth. Many of its controls provide smooth, continuous change over their parameters. Continuous Controller messages (abbreviated as 'CCs') are used to effect changes in a MIDI synth much as the knobs on an analog synth. A Continuous Controller message has a CC number (from 0-127), which is assigned to a synthesis parameter inside the receiving device. The Voyager XL panel controls transmit MIDI CCs, and the same parameters can be controlled externally by MIDI CCs. The Voyager XL uses a non-standard implementation of Continuous Controller messages; refer to the table on page 78 for the complete list of MIDI CCs.

PROGRAM CHANGE: A message that tells the receiving device (synthesizer, tone generator, drum machine, etc.) which preset (or patch, program, etc.) to select. A Program Change command can only specify 128 memory locations (0 - 127), so this command is often used in combination with a BANK SELECT command in order to access all of the memory locations available in modern instruments.


Together, the Program Change and Bank Select commands can specify over 2 million memory locations!

SYSTEM EXCLUSIVE: System Exclusive (SysEx) messages are used for sending information to specific instruments in a MIDI setup. The Voyager uses SysEx messages for sending or receiving presets and for updating the operating system.

MIDI CLOCK: A message used to define a tempo in a MIDI system and synchronize events with that tempo.

Appendix C - Initialization Parameters

When you select the INIT PARAMETERS function in the Panel Mode menu, the current Preset sound defaults to a single 8' square wave oscillator with moderate filtering and basic ON/OFF envelopes. From this starting point, you can adjust and tweak the sound to create a new preset, or just explore the various parameters to see what they do. The following tables list the complete default values of the Initialization Preset.

Front Panel Controls:

SECTION	PARAMETER	VALUE
LFO	LFO RATE	155
	LFO SYNC	OFF
Mod Wheel Modulation Bus	SOURCE	Triangle
	DESTINATION	Pitch
	SHAPING	Filt. Env.
	AMOUNT	022
Pedal /ON Modulation Bus	SOURCE	PGM
	DESTINATION	PGM
	SHAPING	Filt. Env.
	AMOUNT	000
Oscillators	**OSC 1 OCTAVE**	**8'**
	WAVE	**179**
	OSC 2 FREQUENCY	0
	OSC 2 OCTAVE	8'
	WAVE	179
	OSC 3 FREQUENCY	0
	OSC 3 OCTAVE	8'
	WAVE	179
	1-2 SYNC	OFF
	3-1 FM	OFF
	3 KB CONT	ON
	3 FREQ	HI
	GLIDE RATE	104
Switch Controls	GLIDE SW	OFF
	RELEASE SW	OFF

SECTION	PARAMETER	VALUE
Mixer	EXTERNAL	128
	EXTERNAL SW	OFF
	OSC 1	**128**
	OSC 1 SW	**ON**
	OSC 2	128
	OSC 2 SW	OFF
	OSC 3	128
	OSC 3 SW	OFF
	NOISE	128
	NOISE SW	OFF
Filter	CUTOFF	128
	SPACING	0
	RESONANCE	000
	KB CONT AMOUNT	255
	MODE	LP/LP
Filter Envelope	ATTACK	000
	DECAY	000
	SUSTAIN	255
	RELEASE	160
	AMOUNT TO FILTER	+64
Volume Envelope	ATTACK	000
	DECAY	000
	SUSTAIN	255
	RELEASE	160
	ENV GATE	Keybd
Output	MASTER VOLUME	192
	HEADPHONE VOL.	000



1. The GLIDE and RELEASE switch controls are part of the left-hand controller panel on all Voyager Keyboard editions. On the RME, these switch control functions are selected in software from the Panel Mode menus.

2. When initialized, the MASTER VOLUME value defaults to a value of 192 when the Panel Mode 'MASTER VOLUME' function is set to 'YES'. Otherwise, the Master Volume is always controlled by the actual knob setting.

Initialization Parameters (con't)

Preset Software Parameters:

SECTION	PARAMETER	VALUE
General Parameters	PITCH BEND AMOUNT	+/- FOURTH
	KEYBOARD MODE	LOWER KEY PRIORITY
	TRIGGER MODE	SINGLE TRIGGER
	FILTER A	4 POLE
	FILTER B	4 POLE
	FILTER ENV GATE	ENV GATE INPUT (JACK)
	AMPLITUDE ENV GATE	ENV GATE INPUT (JACK)
Touch Surface	X DESTINATION	FILTER CUTOFF
	X CONTROL	OFF
	X DIRECTION	NORMAL
	X AMOUNT	50%
	Y DESTINATION	FILTER SPACING
	Y CONTROL	OFF
	Y DIRECTION	NORMAL
	Y AMOUNT	50%
	A DESTINATION	FILTER RESONANCE
	A CONTROL	OFF
	A DIRECTION	NORMAL
	A AMOUNT	50%
	GATE DESTINATION	NO SWITCH
	GATE CONTROL	OFF
	GATE DIRECTION	NORMAL
	MEMORY BUSSES	NO
	MEMORY GLOBAL	NO

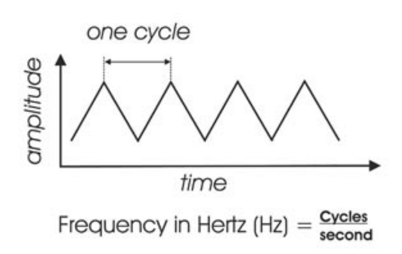
SECTION	PARAMETER	VALUE
Pot Mapping	MAP 1 SOURCE	VELOCITY ATTACK
	MAP 1 DEST.	MASTER VOLUME
	MAP 1 DIRECTION	NORMAL
	MAP 1 AMOUNT	OFF
	MAP 2 SOURCE	KEY PITCH
	MAP 2 DEST.	FILTER RESONANCE
	MAP 2 DIRECTION	INVERSE
	MAP 2 AMOUNT	OFF
	MAP 3 SOURCE	FILTER SPACING
	MAP 3 DEST.	NORMAL
	MAP 3 DIRECTION	50%
	MAP 3 AMOUNT	OFF
	MAP 4 SOURCE	FOOT PEDAL 1
	MAP 4 DEST.	FILTER CUTOFF
	MAP 4 DIRECTION	NORMAL
	MAP 4 AMOUNT	OFF
Modulation Programming (PGM)	MOD. WHEEL SOURCE	NOISE
	MOD. WHEEL DEST.	LFO RATE
	PEDAL SOURCE	NOISE
	PEDAL DEST.	LFO RATE
	SHAPING 1 SOURCE	0 (FIXED VALUE)
	SHAPING 2 SOURCE	0 (FIXED VALUE)
MIDI CLK	MIDI CLOCK DIVIDER	24



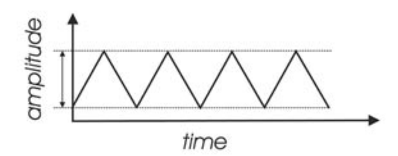
When initialized, the current Preset Name changes to 'Preset XXX Default PROG', where 'XXX' is the actual program number. The Sound Category defaults to 'NOT ASSIGNED'.

Appendix D - Synthesis Tutorial

For those who are new to the world of electronic music, let's take a few moments to go through the basics of sound and synthesis.



Sound is simply the audible change in air pressure. When we perceive sound, our ears are responding to variations in air pressure that happen to occur in our range of hearing. The rate of these variations is called the Frequency, which is measured in cycles per second, or Hertz (Hz). Generally, our ears can hear frequencies from about 20 Hz (on the low end) to about 20,000 Hz (on the high end). The frequency of a sound corresponds to its pitch. A low frequency corresponds to a low-pitched sound (such as a bass) and a high frequency sound corresponds to a high-pitched sound (such as a piccolo).



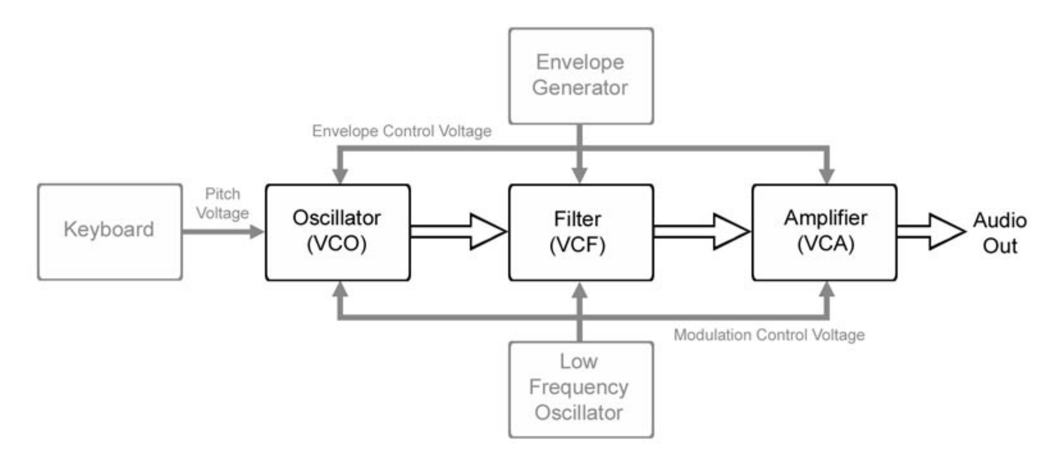
A second perception of sound is its volume or loudness. Loud sounds create big fluctuations in air pressure, while soft sounds create small fluctuations. The measurement of these fluctuations is called the Amplitude, which is measured in Decibels (dB).

A third perception of sound is its tone color, also known as its timbre. There is no standard of measurement for timbre, so instead we use familiar terms to describe the tone color of a sound – bright or dull, buzzy or mellow, tinny or full. The tone color is a function of the harmonic content of the sound. Sounds that are bright and buzzy have a lot of harmonics, while sounds that are muted and dull have few harmonics.

Harmonics are mathematically related overtones of the base pitch. To explain what that means, let's consider an example: if the base pitch is 100 Hz, harmonics will occur at 200 Hz (2 x 100), 300 Hz (3 x 100), 400 Hz (4 x 100), etc. The levels of the harmonics are always much lower than the level of the base pitch, and they decrease as the frequency goes up, so a 200 Hz harmonic will be louder than a 300 Hz harmonic, which will be louder than a 400 Hz harmonic, and so on. Note that there are some sounds that contain overtones that are not mathematically related to the base pitch. These include the 'metallic' sounds created by percussion instruments like cymbals, gongs and chimes, and noise sounds like wind or white noise. The overtones of these sounds are called 'inharmonic', as they don't fit neatly into a mathematical relationship with the base pitch.

Using the electrical circuits in synthesizers, we can manipulate the three parts of sound (pitch, volume and timbre) to create new sounds and simulate existing ones. This process is called Synthesis. There are a number of ways to synthesize sound electronically (including frequency modulation, granular, phase distortion and additive to name but a few), but the method used most often is called Subtractive Synthesis. In Subtractive Synthesis, you start with signals rich in tone color, and then eliminate (i.e. subtract) frequencies to achieve the desired sound.

A synthesizer design based on subtractive synthesis typically consists of three main components and three auxiliary components. The main components are the Oscillator, Filter and Amplifier, and the auxiliary components are the Keyboard controller, Envelope Generator, and Low Frequency Oscillator.

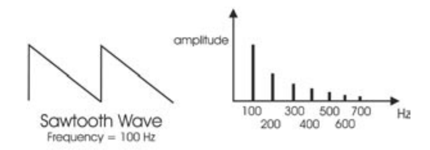


The Subtractive Synthesis Model

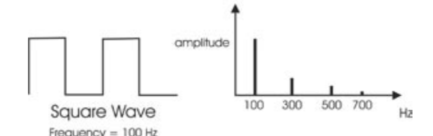
The Oscillator is the starting point of Subtractive Synthesis, for it is here that the initial sound is created. The oscillator creates electrical vibrations which function in a manner similar to the strings of a guitar; they create the signal source that the rest of the system will use to modify and shape the sound. The key oscillator parameters are pitch and waveform.

The pitch of the oscillator is primarily determined by the keyboard, which creates specific pitches based on an equal-tempered scale (more about the keyboard later).

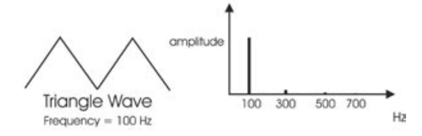
The waveform determines the harmonic richness of the audio signal. There are four basic waveforms common to most synthesizers: sawtooth, square, triangle and sine.



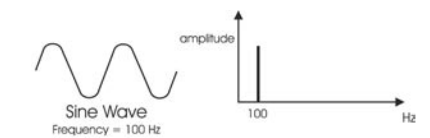
The sawtooth wave is the richest sounding of the four waves. It contains all of the harmonics, and has a bright, buzzy sound. Sawtooth waves are ideal for brass and string sounds, bass sounds and rich accompaniments.



The square wave possesses a hollow sound compared to the sawtooth, owing to the fact that it contains only odd harmonics. This hollow characteristic is ideal for distinctive lead and sustained (pad) sounds. An interesting aspect of the square wave is that the waveshape can be changed to make the top and bottom parts asymmetrical, creating a pulse wave. By changing the shape of the wave, new harmonics are introduced. Pulse waves are ideal for creating clavinet-like sounds, but are also useful for creating lush pads. Many synthesizers allow you to dynamically control the shape, or 'width' of the pulse wave using modulation sources such as a low frequency oscillator (LFO). This type of waveform control is known as 'pulse width modulation', or PWM.



Like the square wave, the triangle wave only contains odd harmonics, but the levels of the harmonics in a triangle wave are much less. The triangle wave has a soft, slightly buzzy sound that is suitable for high-pitched leads (like a flute) or adding a beefy sub-bass to bass sounds.

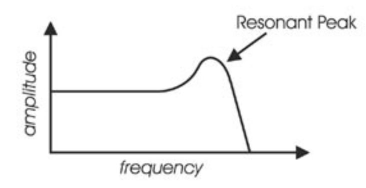


The sine wave is the purest waveform of them all. It has no harmonics, so it produces a very pure tone. Because of this, sine waves generally aren't used as primary audio signals, but are often used to reinforce or enhance other waves. They are also used as modulation sources.

Synthesizers often have more than one oscillator, and each oscillator usually has its own frequency and waveform and level (volume) parameters. Several oscillators make possible rich and complex sound source configurations. Some synthesizers also permit external audio signals to serve as sound sources, allowing you to combine them with the oscillators, or process the external audio by itself using the synthesizer components.

The combined sound sources are routed to the Filter, the circuit that removes unwanted frequencies. Although there are several different types of filters, the Voyager offers two of the most useful types: Lowpass and Highpass.

As the name suggests, a Lowpass filter allows low frequencies to pass while removing high frequencies. On the other hand, a Highpass filter does just the opposite - it allows high frequencies to pass while removing the low frequencies. Filters commonly have several adjustable parameters to allow you to modify and shape the sound; these are called Cutoff and Resonance.



Frequency response of a Lowpass filter with Resonance

The Cutoff is the point at which the filter begins to remove frequencies (refer to the Lowpass filter response curve at left). Above the Cutoff point, frequencies are gradually reduced according to the filter's slope, which is a measure of how well the filter works. The steeper the slope, the greater the reduction of frequencies.The slope of a filter is expressed in decibels per octave (dB/Oct). In many synths the slope is a fixed value, but in the Voyager four different slopes can be programmed individually for each filter (-6, -12, -18 and -24 dB/Oct). This allows great flexibility for sound creation, from a subtle reduction of frequencies at the lowest setting (-6 dB/Oct) to a dramatic reduction of frequencies at the highest setting (-24 dB/Oct).



The Voyager XL filters can be configured two ways: as dual Lowpass filters (in stereo) or as one Highpass/Lowpass filter combination (in mono). When the HP/LP configuration is chosen, the filters combine to form a Bandpass filter. This filter configuration passes middle frequencies while removing both high and low frequencies. For more on Voyager filter configurations, see page 25.

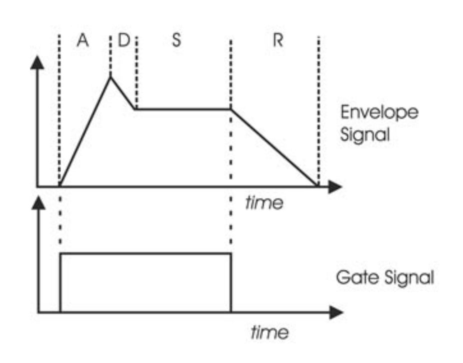
The other adjustable filter parameter is Resonance. Resonance describes a variable peak that appears at the Cutoff point as you increase the Resonance amount. As this amount is raised, the frequencies that appear in that part of the spectrum are boosted. It's possible to adjust the Resonance amount to the point where the filter actually self-oscillates. When this occurs, the filter's oscillation frequency is at the Cutoff point.

The Filtered signal is routed to the Amplifier, which controls the gain (volume) of the signal. The Amplifier controls the dynamics of a sound, turning it on and off as you play. The Amplifier is usually paired with an Envelope Generator (described below). The gain of the amplifier follows the contours of the Envelope Generator signal, shaping the sound from start to finish.

The Oscillator, Filter and Amplifier are voltage controlled, meaning that they respond to changes in voltages. For the Oscillator, it means the higher the voltage, the higher the pitch. For the Filter, it means the higher the voltage, the higher the cutoff frequency. For the Amplifier, this means the higher the voltage, the greater the volume. Since each of the three main components respond to a voltage, the entire synthesis system thus has a common control element. This provides great flexibility for sound programming, and allows auxiliary components, like Envelope Generators and Low Frequency Oscillators (which generate control voltages) to further vary the sound.

Returning to our Subtractive Synthesis model, the first of the auxiliary components is the keyboard. The keyboard provides a familiar musical instrument 'interface' that produces a control voltage and trigger signal whenever a key is pressed. The level of the control voltage signal is a function of which key is pressed - the higher up on the keyboard you play, the higher the level of the control voltage.

The keyboard's control voltage signal is commonly routed to the oscillators to control the pitch, and it can also be routed to other voltage-controlled components like the filter, to vary the cutoff frequency. The keyboard trigger signal is routed to the Envelope Generators to trigger the envelopes.



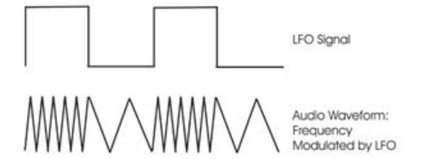
The second auxiliary component is the Envelope Generator, or EG. The EG makes no sound by itself. Rather, it creates a time-varying control voltage that is typically used to control the gain of the amplifier, or the cutoff frequency of the filter. Many synthesizers, including the Voyager, provide several EG's for independent envelope control of the amplifier and filter circuits.

The EG is triggered from a Gate signal that is generated every time a key is pressed on the keyboard. Once triggered, as long as the key is held down (i.e. the Gate signal is present), the EG envelope will evolve according to the control settings.

The Voyager's Envelope Generators have four stages that can be set individually:

Attack – The time to go from zero volts to the maximum voltage (the fade in time).
Decay – The time to go from the maximum voltage to the Sustain level.
Sustain – The maximum level of the envelope after completing the Attack and Decay stages (if the key is held). When the Sustain level is zero, the envelope consists of just the Attack, Decay and Release stages. With zero Sustain, if the Attack and Decay stages complete before the key is released, the Release stage is ignored. If the Attack and Decay stages do not complete before the key is released, the remainder of the envelope is controlled by the Release stage.
Release – The time to go back to zero volts when the key is released (the fade out time).

The last auxiliary component is the Low Frequency Oscillator, also known as the LFO. The LFO operates like the main oscillators in almost all respects, but generally at a much lower frequency. LFO's are typically used to send modulation control signals to the main components. For example, if you route a 6Hz LFO signal to an oscillator, it will produce vibrato by varying the pitch of the oscillator. If you send that same LFO signal to the amplifier, and you'll get tremolo. LFO's create cyclical variations in the sound, making the sound more dynamic and interesting.



So there you have it - the six basic components that make up a synthesizer based on the subtractive synthesis model. Keep in mind that most 'subtractive' synthesizers often include more than one of each component. This is especially true of the oscillators and envelope generators, but may also be true of filters, amplifiers and LFO's. For example, the Moog Voyager has three oscillators, two filters, two amplifiers, an LFO, two extensive modulation sections, and the Voyager's third oscillator can act as an additional LFO. As you would expect, synthesizers that offer more than one of each component provide a broader palette for sound creation then those that don't, and generally result in sounds with a greater complexity, variation, and depth. Add some solid programming and playing technique, and incredibly expressive musical sounds can be achieved.

So what is the best way to program synthesizers effectively? The answer to that question could fill a book's worth of explanations and examples. Fortunately, a number of excellent books have been written on the subject in recent years. Two such recommendations, readily available, are:

"Power Tools for Synthesizer Programming" by Jim Aiken, available from Backbeat Books
"Analog Synthesis" by Reinhard Smitz, available from Wizoo Publications

You can also learn a lot from examining the factory presets in detail. The Voyager's presets were crafted by some of the best sound designers in music today, and you can learn their secrets simply by exploring the individual parameters that makeup the sound. Just dial up a few presets and dig in!



You can view the parameter values of any preset by setting the Parameter Display menu (PANEL function 1.2) to "Yes" or "3sec". With either of these settings selected, when you adjust any knob or switch the stored and current values will be displayed. With this information you could then reconstruct the preset by adjusting every knob and switch to the stored value. This is a great way to learn how a sound works, and 'see' a preset.

For more information, see the "Parameter Display" menu description, page 47.

As with all musical instruments, practice, exploration and experimentation are an important part of achieving great results. Spend a little time getting to know your new instrument - your efforts will be rewarded!

Appendix E - MIDI Implementation Chart

Moog Music, Inc. Date: 9/26/10
Voyager XL Analog Synthesizer Version 3.6

FUNCTION	TRANSMITTED	RECOGNIZED	REMARKS
Basic channel Default Changed	 1-16 1-16	 1-16 1-16	 Memorized
Mode Default Messages Altered	 3 O** X	 4* O** X	 * Note priority is user selectable ** All Notes Off
Note number True Voice	0-127 ********	0-127 0-127	
Velocity Note ON Note OFF	 X X	 X X	
After touch	X	X	
Pitch Bend	O	O	
Control change	O	O	Transmit: CC1, 5-31 (MSB) CC35, 37-63 (LSB) CC 65-127 Receive: CC1-31 (MSB) CC33-63 (LSB) CC65-88, 93-95, 102-109
Program change True Number	O 0-127	O 0-127	
System Exclusive	O	O	Must be enabled
System Common	X	X	
System Real Time Clock	 X	 O	 MIDI Clock
Aux Messages	X	X	
Notes			

Legend: O = Yes
X = No

Modes: Mode 1 - Omni On, Poly
Mode 2 - Omni On, Mono
Mode 3 - Omni Off, Poly
Mode 4 - Omni Off, Mono

Appendix F - Service and Support Information

Moog Limited Warranty

Moog Music warrants its products to be free of defects in materials or workmanship and conforming to specifications at the time of shipment for a period of one year from the date of purchase. During the warranty period, any defective products will be repaired or replaced, at Moog Music's option, on a return-to-factory basis. This warranty covers defects that Moog Music determines are no fault of the user. In countries outside of the USA, contact the Moog authorized distributor listed on our web site (www.moogmusic.com) for service.

Returning your Product to Moog Music

You must obtain prior approval in the form of a Return Material Authorization (RMA) number from Moog Music before returning any product. You can request an RMA number on-line using the 'Product Register' link on the Moog Music home page or call us at (828) 251-0090. The Voyager must be returned in the original inner packing including the foam inserts. The warranty will not be honored if the product is not properly packed. Once packed, send the product to Moog Music Inc. with transportation and insurance charges paid.

What we will do

Once received, we will examine the product for any obvious signs of user abuse or damage as a result of transport. If the product has been abused, damaged in transit, or is out of warranty, we will contact you with an estimate of the repair cost.

How to initiate your warranty

Please initiate your warranty on-line at www.moogmusic.com by clicking on the "Product Register" tab. If you do not have web access, fill out the all the information on the included warranty card and mail to:

Moog Music, Inc.
Attn: New Product Registration
2004-E Riverside Dr.
Asheville, N.C. USA 28804

Appendix G - Caring for the Voyager XL

Clean the Voyager XL with a soft, moist cloth only – do not use solvents or abrasive detergents. The wood casing can be cleaned with a guitar polish, or a fine furniture polish. Heed the safety warnings at the beginning of the manual. Don't drop the unit. If you are shipping your Voyager to the factory for servicing, we recommend using the original shipping carton, or an ATA approved Road Case. Shipping the Voyager XL in a non-ATA or packaging other than the original carton will void the warranty. When setting up the Voyager XL, be sure your stand or table is capable of holding at least 50lbs..



IMPORTANT SAFETY NOTE: Do not open the chassis. There are no user serviceable parts in the Voyager. Maintenance of the Voyager synthesizer should be referred to qualified service personnel only.

Appendix J - Specifications

Type:
Programmable monophonic analog synthesizer

Sound Generation:
3 Oscillators with continuously variable waveform control, 1 Noise source, 5-input Mixer, 2 Filters, 2 Envelope Generators, 1 LFO, 2 Programmable Modulation Sections, Glide and Fine Tune controls

Program Memory:
1024 Presets in 8 Banks; 896 locations are user rewritable

Keyboard:
61 keys (C-C)
Transmits polyphonic MIDI Note On/Off messages along with velocity and aftertouch

Performance Controls:
Pitch Wheel: programmable, up to ± 31 semitones (2 octaves and a 5th)
Modulation Wheel: 0 to 100%
Glide and Release Switches: On/Off
Ribbon Controller: single axis controller that generates CV and Gate control signals based on the position of the player's finger.
Touch Surface: programmable, three dimensional surface that generates continuously variable control signals based on the posiition of the player's finger and the amount of contact area the finger makes with the surface.
Master Volume Control: 0 to 100%

User Interface:
Mode Controls: Preset, Edit and Master function buttons
Selection/Navigation Controls: Cursor, Enter, and -1/+1 buttons

Modular Patch Panel:
Pedal/Control Jacks (14 inputs for external control of various CV and Gate functions, 23 CV and Gate outputs)
(2) Bi-Directional Attentuators with OFFSET
Four-Input Mixer section with OFFSET and MASTER Attenuator
LAG Processor (1msec to 1sec)
A Six-waveform, 2 Output LFO processor with MIDI SYNC and External Clock capabilities

Back Panel:
AC Power Inlet (universal power supply, 100-250 VAC, 50-60 Hz)
Power ON/OFF switch
Stereo Audio Output jacks (unbalanced outputs)
External Audio In jack
Mixer Out/Filter In jack
(2) TNC Lamp Sockets: supplies 12V 0.5A (5W bulb maximum) per connector
MIDI In, Out and Thru connections

Outputs:
Stereo Audio Output: Two ¼" jacks on back panel
Headphone Output: ¼" TRS jack on front panel with a dedicated Volume control.

Dimensions:
41.25" W x 18" D x 3" H (panel flat)
41.25" W x 18" D x 12" H (panel upright)

Weight:
49lbs (22.2 kg)

Operating System;
Flash upgradeable via MIDI SysEx

Specifications subject to change without notice

Glossary

Here are a few key terms that cover the basics of sound generation as used in the Voyager synthesizer.

ADSR – Abbreviation for Attack, Decay, Sustain and Release, the four stages of an envelope control voltage.

Amplitude – The strength of a sound's vibration measured in Decibels (dB). Amplitude corresponds to the musical term Loudness.

Continuous Controller (CC) – A type of MIDI message used to transmit control commands. These commands are digital control signals for parameters such as volume, vibrato and panning.

Control Voltage – Control voltages (also called CVs) are used in analog synthesizers to affect changes in the sound. In the case of pitch, pressing a key on the keyboard sends a control voltage that determines the pitch of the oscillators. The keyboard CV is set to produce an equal tempered scale. As you play up the keyboard, the CV is raised and the pitch increases. The pitch can also be affected by other CV sources, like an LFO, often used to produce vibrato. Other major synthesizer components that respond to CV's include the filter (the higher the CV, the higher the filter cutoff frequency) and the amplifier (the higher the CV, the higher the gain, or volume).

Envelope – An envelope describes the contours that affect the characteristics of a sound (pitch, tone and volume) over time. For example, when a string is plucked, its amplitude is suddenly very loud, but then dies out gradually. This describes the Volume envelope of the sound. We observe that the initial part of the plucked sound is very bright, but then the brightness fades away. This describes the Tonal envelope contour. We also hear the frequency of the sound go slightly higher when the string is plucked, and then drop slightly as the note fades. This is the pitch envelope contour. A synthesizer can create these kinds of changes by applying electrically generated envelopes to oscillators (affecting pitch), filters (affecting tone) and amplifiers (affecting volume).

Envelope Generator – A circuit that generates an envelope signal. The envelope generator creates a time-varying signal that can be applied to any voltage-controlled circuit. The Envelope Generators in the Voyager have four adjustable segments: Attack, Decay, Sustain and Release, also sometimes referred to as ADSR. The Attack, Decay and Release segments are specified as time parameters, while the Sustain segment is a simply a level setting. Attack specifies the onset time of the envelope. For example, the sound of a plucked string starts suddenly, meaning its volume envelope has a fast attack time. Decay specifies how quickly the onset of the envelope fades into the sustained portion. Sustain is the level at which the envelope sustains after the initial transient (the attack and decay portion). Finally, Release determines how long the envelope takes to fade away. An Envelope Generator uses a trigger to start and stop the ADSR envelope. This trigger is called a gate signal, and it's produced whenever a key is pressed on the keyboard. The gate signal turns on and stays on as long as a key is held down. When the key is released, the gate signal turns off. When the gate is on, the Envelope Generator is triggered and the envelope signal moves through the Attack and Decay segments and settles at the Sustain level as long as the gate signal is on. When the gate goes off, the release segment of the envelope begins. A new gate signal retriggers the Envelope Generator.

EEPROM – EEPROM stands for 'Electrically Erasable Programmable Read Only Memory'. This is a type of digital memory used to store information, even after the power is turned off. In the Voyager, the EEPROM is used to store global settings and presets, and operating system parameters.

Filter – A circuit that removes some frequencies and allows other frequencies to pass through the circuit. A filter has a cutoff frequency that determines the point at which frequencies begin to be removed. A lowpass filter is one in which frequencies above the cutoff frequency are removed and all frequencies below the cutoff are passed through. A highpass filter is one in which frequencies below the cutoff frequency are removed and frequencies above the cutoff are passed through. A bandpass filter has two cutoff frequencies that define a frequency band, outside of which the frequencies are removed.

Frequency – The rate of vibration in sound measured in Hertz (Hz or cycles per second). The average hearing range of the human ear is from 20 to 20,000 Hz. Frequency corresponds to the musical term 'pitch', but the two terms are not always interchangeable. Frequency is an objective measurement of a sound, while pitch is the perception of a sound, low, high, or mid-ranged. A low frequency corresponds to a low-pitched sound such as a bass; a high frequency sound corresponds to a high-pitched sound such as a piccolo. In music, a change in pitch of one octave higher equals a doubling of the frequency.

Frequency Modulation – Also known as FM, Frequency Modulation describes the technique of using one oscillator to modulate the frequency of another. In FM, the modulating oscillator is called the 'modulator', while the other oscillator is known as the 'carrier'. The carrier oscillator is the one you hear. When the modulator frequency is very low (about 6Hz), the effect is described as vibrato. As the modulator frequency is raised into the audio range, new modulation frequency components are created, and the effect is perceived as adding new overtones to the carrier signal.

Glide – Also called portamento, is the slowing down of pitch changes as you play different notes on the keyboard. Certain acoustic instruments, like the trombone or the violin, create this effect when the performer adjusts the tubing or string length. The speed of the glide is called the glide rate. In synthesizers, a Glide Rate control determines the speed of the glide between notes.

Harmonic – A sound is made up of simple vibrations at many different frequencies (called harmonics) that give a sound its particular character. This corresponds to the musical term timbre or tone color. A harmonic sound, such as a vibrating string, is one in which the harmonics are mathematically related by what is called the harmonic series. These sounds are typically pleasing to the ear and generally the consecutive vibrations have the same characteristic shape or waveform. An inharmonic sound, such as a crash cymbal, is one in which the harmonics are not mathematically related. Their waveforms look chaotic. White noise is an inharmonic sound that contains equal amounts of all frequencies.

LED (Light Emitting Diode) – An electrical component that lights up when a voltage is applied.

Low Frequency Oscillator – Also called an LFO, this is a special type of oscillator that generates signals primarily below the range of human hearing (generally below 20 Hz). LFOs are typically used as a source of modulation. For instance, an LFO with a triangle waveform, set to about 6 Hz and modulating the pitch of a VCO results in vibrato. Changing the LFO waveform to a square wave will result in a trill. An LFO modulating a VCA with a triangle wave creates tremolo.

Mixer – A circuit for combining multiple sound sources or signals.

Modulation – Modulation is the use of a control voltage to shape a tone. Modulation has a source, a destination, and an amount. This could be as simple as the filter cutoff of a VCF (a modulation destination) being changed by the front panel cutoff control (the source), or as complex as mixing multiple CVs together to modulate filter cutoff. Modulation is used in synthesis to create complex sounds and add variation.

Noise – A random audio signal having no fundamental, and where all the harmonics have equal strength (more or less). Noise can be used as either an audio or modulation source. When used as an audio source, noise can be used by itself to synthesize explosions or wind noises, or can be mixed with other waveforms to create noise artifacts, such as breath sounds. When used as a modulation source, noise can introduce instabilities to a sound, such as a 'pitch cloud' effect when noise modulates an oscillator. In the Voyager, noise is available both as a sound source and a modulation source.

Oscillator – A circuit that electronically "vibrates". When used as a sound source, an oscillator is the electronic equivalent of a vibrating reed, or string. When amplified, an oscillator produces a pitched sound whose frequency is determined by one or more control voltages. Changes to these voltages correspond to changes in pitch. An oscillator's vibration can have different shapes or waveforms, such as a triangle, sawtooth, or square wave. The Voyager has three oscillators for generating sounds.

Pitch – The subjective perception of sound. A bass guitar generates low pitches, while a flute generates high pitches.

Pole (or poles) – A term referring to the design of a filter circuit. Each filter pole adds 6 dB/Octave of attenuation to the filter response, so while a single pole filter has a 6dB/Octave response, a 4-pole filter has a 24dB/Octave response. The filters in the Voyager are programmable, allowing the user to select 1,2, 3 or 4 poles for each filter.

Sample and Hold (S&H) – A circuit that generates a control voltage corresponding to the input signal at the time a trigger or gate signal is received. Sample and hold circuits commonly employ white noise as a signal source, taking periodic samples of this signal and holding that sample (a voltage level) until the next sample is taken. Since the signal source is noise (a random audio signal), the output of the S&H circuit is also random. The sampling interval is typically controlled by a low frequency oscillator (LFO). By adjusting the speed of the LFO, the speed of the S&H circuit can be varied. The S&H output is available as a programmable modulation source.

Sound – Audible vibrations of air pressure. For electronic sounds such as those produced by a synthesizer, loudspeakers are used translate the electrical vibrations into the changes in air pressure which we perceive as sound.

Subtractive synthesis – A method of creating tones using harmonically rich (bright) source material, and then removing (or in some cases emphasizing) various frequency components to create the desired sound.

Synthesis – The generation of sound by electronic means, where programmer/performer has the ability to change the pitch, volume, timbre and articulation.

Timbre – Pronounced 'tamber', it refers to the quality of a sound by its overtones. An unprocessed sawtooth wave has a bright timbre, while a triangle wave has a mellow timbre.

Tremolo – Technically a form of low frequency amplitude modulation, tremolo is a smooth audible pulsing of volume. In synthesizers, tremolo is produced when a 5-6Hz LFO triangle or sine wave signal is applied to a voltage controlled amplifier.

Waveform – The shape of an oscillator's vibration. This determines its timbre. Commonly used waveforms in subtractive synthesis are sawtooth, triangle, square, or rectangular. Different waveforms have different timbres. A sawtooth has the greatest number of harmonics, and sounds bright and buzzy. A square wave has only odd harmonics, and sounds bright, but hollow, like a clarinet. A rectangular wave can vary in shape, but typically has a bright but thin sound, and a triangle wave's harmonics are so low in amplitude that it sounds muted and flutelike.

VCA – Short for Voltage Controlled Amplifier, a VCA is an amplifier circuit where the gain is a function of the control voltage. In the Voyager, the VCA is paired with the Volume Envelope Generator to specify the articulation of a sound. Another CV source for the VCA in the Voyager is the Volume CV Input.

VCF – Short for Voltage Controlled Filter, a VCF is a filter circuit where the filter cutoff frequency is a function of the control voltage. A VCF is used to control the timbre of a sound. In the Voyager, the VCF is paired with the Filter Envelope Generator for dynamic control. Other CV sources for the VCF include the Keyboard Amount, Modulation Matrix and Filter CV Input.

VCO – Short for Voltage Controlled Oscillator, a VCO is an oscillator circuit where the oscillator frequency is a function of the control voltage. In the Voyager, the VCO is primarily controlled from the keyboard. Other CV sources for the VCO include the Modulation Matrix, and Pitch CV Input.

Vibrato – Technically a very low frequency modulation, vibrato is a smooth, mild pitch warble. In synthesizers, vibrato is produced when a 5-6Hz LFO triangle or sine wave signal is applied to a voltage controlled oscillator, causing the pitch to deviate slightly above and below the base frequency.

Voyager XL – A 40th anniversary edition of the Minimoog Voyager, a monophonic analog synthesizer designed by Bob Moog that is a descendant of the classic Minimoog.

Voyager Preset List

The Voyager contains 8 banks of presets with 128 presets per bank (1024 presets total). The tables on the following two pages provide of list of the presets in each bank. Many of the preset names are self-explanatory, some are for fun, and all are all worth auditioning. As you listen to the presets, remember to check out the Mod Wheel, Touch Surface and Aftertouch for additional performance control.

Credits:

Bank A (designed for the Voyager Select Series)
Contributors: Mike Krewitsky, Roger O'Donnel, Ben Wilson, and Moog Music

Bank B (designed for the Voyager Rack Mount Edition)
Contributors: Nigel Hopkins, Brian Kehew, Will Alexander and Moog Music

Bank C (designed for the Voyager Electric Blue Edition)
Contributors: Bernie Worrell, Drew Newmann, Steve Dunnington and Amos Gaynes

Bank D (designed for the Voyager Anniversary Edition)
Contributors: Aron Magner, Chad Hugo, Darrell Diaz, Frank Lucas, Fred Wreck, Gabrial McNair, Geoffrey Keezer, Herbie Hancock, Khari Simmons, James Lumb, Jamie Muhoberac, Joseph Rivers, Neil Palmer, Printz Board, Randy Cantor, Rick Wakeman, Brian Kehew, Mark Kline and Steve Dunnington

Bank E
128 presets created exclusively by Zon Vern Pyles

Bank F
128 presets created exclusively by Thomas Wolf

Bank G (designed for the Signature Series Edition)
Contributors: Brian Kehew and Moog Music

Bank H
Bank H is the factory preset bank from the flash ROM, which duplicates the Presets in Bank E. You can access these presets just like any other bank, but you can't save any changes to bank H.

	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F	Bank G
1	Tasty Moog Bass	Speaker Danger Bass	Big Detuned Bass	RUNNING BASS	I'm Ba-aack!!	CLASSIC MINI	Oooof
2	Techno Tuvans	Simply Smooth	Tweezy Grunge	BIG SEQUENCE BASS	Chiffy Lead	HAMMER'S PULSE	Trogg
3	Electric Panning Keys	Mod Wheel Dive Bomb	Glide Lead	CLASSIC BASS	Brassy Lead	GEORGE'S NARROW PULSE	Classic
4	A Minor Story Panned	Climb	Stringy	BRAIN SALAD BASS	Robo Vox	SOFT MINI	Old Noise
5	Solar Lead	Squeaky Bells	Bernie Down Da House	RUBBER BAND BASS	Growing Lead	STEVE'S WINWOOD	Mellow Lead
6	Membrane Mallet	Subtle 5ths	Warm Wow Bass	CHAMELEON BASS	X-tra low Bass	JOE'S 2600	Theremini
7	Acid Mod Grind	Just the Sub	Electro Marimba	FINGER BASS	Mellow Hammer	T. WOLF'S GUITAR	Smoosh
8	MajorWerk	Velocity Growl	Mellowness	XBASS	Hollow Bass	CHICK'S FIVE	Dee-Dah
9	Wo ist der Sinus?	Filtroid Damage	Rude Sync Lead	STABNAMMIT	Brain Salad Buzz	HEAVY S+H	Spot Lite
10	Lead or Follow	Black Market	Submarine Landscape	FAT FILTER	Gurglet	CLASSIC SAW	Cop Show
11	Really Heavy	Chinease	Any Color Lead	WRECK*BASS	Cycler mod (wheel up)	WISH YOU WERE HERE!	1976
12	PWM in the Bass	Yammerer	The Way We Feel	METAL STRINGBASS	Wetness (wheel up)	HERBY'S D6	Clockwork
13	Orgone Box	Fat Drums	Bernie's #01Woo~man	DOPE BASS	Animated (wheel up)	JAN'S HAMMER	Mars
14	Mellow Brass Bass	In The Net	Outer Limits Clav	CATHERINE OF ARAGON	He was lucky	HIP HOP B3	Clang
15	Soundscape Shifter	4ths Synth	Squelcher	ROGER 0 RIP	Tympanic membrane	FIRST SEVEN NIGHTS	Ton
16	8-Bit Video Game Sound!!	Nige Classic Bass	Man Child Lead	HELLA BASS	Kinda saxy	FIRST NIGHT SYNCED	Popcorn
17	Wormy Lead	Seq. w/ Mod Wheel Ring	Destructo Drum	RUB-A-DUB BASS	Analog Daze	MOOG HARP	Welcome
18	Clean Machine	Oboe&Bassoon	Organ Transplant	NEW WAVE BASS	Heartbeat	RICK'S CATHERINE	Bold Bass
19	Sync or Swim	Bass Sweep + Grungy Wheel	Sci-fi Wiggler	CHEEGLE SYNC	Electric Room	BILLY'S DRUM MW+PEDAMOUNT	Frank
20	Velocity Temple Bells	Sci-Fi Honky-Tonk	Glass Backwards	SKYCHURCH BASS ESC	Monica	MOOG BASS	Triggy
21	Mod Wheel Buzz	Can U Solo	Lead Runner	DARK VOICE BASS	Wheel Bass	THE FAT ONE	Fusion
22	Floating Mod Steel Guitar	Tiny Touch	Snappy Bass w/Sub	BASS JONES	Vowel Bass (wheel up)	PUNCHER	Stunner
23	Tiny w/o Mod	Sweet but Weird	Waveform Dance	1996	Slippery Lead	LIKE CHILDREN	School Bass
24	Big Boy	Endless Moog	Trumpet	CLAV BASS	Classic Ripper	PLUCK IT!	Fozzy
25	High as a Kite	Queen of Chi	Mod Wheel Pedal Steel	BROKE LOW BASS	Toad Bass	I AM THE BASS	Groover
26	Running Drone	Old Castle	Nukular Canine	BURNS FOR BASS	Velocity Bass	THE BIG ONE	Growth
27	Subaquaeous Lead	Citadel Bass	Mod Wheel Whistler	ALL NIGHT BASS	Velowave Bass	FRETLESS	Punch
28	Too Low	HPcompressedClav	Space Bell Drum	ACIDIC BASS	Funny Vox	BACK TO THE ROOTS	Elastic
29	Slow Wave Dancer	Mod Wheel Theremin	Cars Intro (Mod Wheel)	FUNKY BASS	Minor Glider	FUNK IT	Biplane Modwheel
30	The Cheez	Hard Attack	Grinder Lead	TUBE BASS	Prog Lead	FUNKY CAT	1968
31	Slow, Deep, High	Talk 2 Me Guitar	Strange Bass	TIGHT BASS	Forever Lead	GETTING MEAN	Solar
32	Rezzy Fifths	Grits and Eggs Bass	Purple Jude	SYNCROWL	Here it comes	GETTING MEAN AGAIN	Troll
33	Glassy Mod Sparkle	Jan 7 Days	Deep Space Tones	CUTIE PIE BASS	Panning Throbber	WIRED	Runner
34	Rezzy Manic Lead	Diet of Worms	Squeaker Lead	SMOOTH BITE	Zappy Bass	JOE PASS WAS HERE	Hard
35	Crispy Evolution	Wonder Mini	Bow Wow Bass	SLOW SWEEP BASS	Classic Sweeper	WIRED BASS	Flaut
36	Controller Bass	Dr Who Bass	Mellow and Horn-like	SQUARE FACE BASS	Touchpad sync	CHICK'S ROM WARRIOR	Solid
37	Overcast Pad	Rob Progs Out	One Pole Bass	AQUATARK LEAD	First Love	CHICK'S OBOE	Stinger
38	Really Weird Drum	Get The Funk	Old Movie	HELLO	Clearly fuzzy	ANOTHER HAMMER	Boca
39	Mod Heavy	Horror Intro	Fat PWM Bass	LEAD DOG	Fond Memories	JAN'S KEYCLICKER	Girth
40	Slow Impression	Metallic Percussion	Mod Wheel Buzz Saw	JAZZBO FLUTE	Flyin' fingers	RESONANT PULSE	Pomp
41	Rubber Flute Damage	Mini Prog Lead	Plucked Whistler	DIG-DUG	Worms of funk	TAKE FIVE	Cutter
42	Wormy Bass	Pedal Power	Rubbery Keys	HEALTHY LEAD	Tremowah Bass	HAMMER FLUTE	Parsec
43	Velocity Decay	Good old Faithful	Square Glider	DONIMATRIX	Welcoming machine	I AM THE ONE	Baa Baa
44	Dark Electricity	Bowed Shifter	Alien Insects	FIFTH SYNC LEAD	Touchpad horn	THEREMINE?	Noid
45	Soft Wobbly Lead	4ever Return	Mongo Res Lead	DPG*LEAD	Still fun (wheel up)	SPACY	Perco
46	Random Pan Pad	Significant Sonics	Ripper Bass	WHAM BAMM...	Subfood Bass	JUST RESONANCE!	Zinger
47	Plucky Lead	Rose Lead	Duke it Out Lead	OLD MINI	Firm bottom	BULLETS?	1969
48	A Touch of Growl Bass	Bell Drops	wooOOOOooow	SCIENCE	Lunar News (wheel up)	B3 SOLO	Oh-Wa
49	Abrasive Wheel	Tony Moog	Eccentric Orbit	MOSHI MOSHI	Seafoam (wheel up)	TIME FOR SURFIN'	Slider
50	Booty Drop	Velocity Felicity	Sawtooth Lead	ELO SWEEP	Wheel talker	PANIC?	Fuzzy
51	FiltOrgNasty (WheelUp)	Mod Lead	Kalimboid	TRILOGIC	Living Bass	V BASS	Source
52	FM ClunkBass	Oscillator Mayhem	Crinkly lead	CELLOGY	Pucker up	STOMPING MM TRY MODWHEEL	Wonder
53	Kick the Sub	Square Lead	Kick Factory (wheel up)	DR.MADNESS	Lil' delay	GET SYNCED! TRY MODWHEEL	Spider
54	DX Bass Bite	In Yer Face	Lectrafunk Bass	CALLN OUTNAMZ	Utopian Lead	FLAGEOLET? TRY VELOCITY	Slick
55	Tiny Sparkle Mod Lead	Bright Plucky Lead	Slow and Shifty	CHORUSED LEAD	Bouncer (wheel up)	SYNCED HARP TRY VELOCITY	Glom
56	Soft Velo Harmonics	My Brass Bed	Bloom Bass	COME BACK LEAD	Stereo Zaps	CHENG TRY VELOCITY	Tubby Bass
57	Stringy Bite	FM 5ths	Dynamic Buzz	KEEZER LEAD	In the pocket	SYNCED GUITAR	Donefor
58	Teknomancer minor3rd	Boogie Bass	Vocal Pulse Mod	TIGERMOUNT	Going Baroque	MYSTERIOUS FLUTE	Clippers
59	Thicka Shread	Threw a Party	Pipes & wheels	PSYCHEDELIC FICTION	Flutey	RUDI'S SPACYPHASER	Scoop
60	Skinny but Fat	L'i'l 5th Wheel Echo	Impact Bass	REPEATER	Relaxed Bass	SOME MODULATION?	Electro
61	Warm Keys	Snappy	Mumbler Lead	FREDWRECK BAZ	Mystery metal	DOUBLE-BASS	Bug Drops
62	Rock You Do	I'm Large	A Drone	ZAZA'S MATH	"B" drone jam	THE DUKE	Sub Kick
63	Free Theme	Trick of the Tail	Our Daily Lead	TRIUMVIRATE	No knives please	S+H SWEEPER TRY MODWHEEL	Perc.1
64	A Basic Punchy Sucka	Nasty Drums	Instability	GAMES W/O FRONTIERS	Topographic melodies	MOOG AND THE MECHANICS	Hhat

	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F	Bank G
65	The One	Distant Cousins	Glocken	LEAD CLICK	Familiar growl	SQUAREDANCE	Syntom
66	New Sync Mod Solo	Chick Lead	Bright and Rezzy	BEAUTIFUL 1	Make it sing	TECH NO!	Preset Default PROG
67	Buzzed Pluck Lead	Big Punch Sub	Two Pole Growler	COMPTON LEAD	For Ripley	SOME RING-MODULATION?	Preset Default PROG
68	Truth In You Theme	S and H Cluster	Future Lead	FM-SYNC	Other life	I LIKE S+H!	Preset Default PROG
69	Tonto Bass	Weird Pizzicato	Bass Drops	SOULFUL LEAD	Epiphany	SPACE INVADER	Preset Default PROG
70	Tonto Lead	2 Pole Bass	Plucky Lead	SKYCHURCH DULCIMER	Crop circle delivery	BASS BOOSTER TRY M2PEDAL	Preset Default PROG
71	BothHi&Lo (radioTP)	Asao's Cakewalk	Basswerk	SINGING LEAD	Swamp life	FLANGING VOYAGER	Preset Default PROG
72	Fifths of Fury	Accordion	Mod WheelHowler	DIGITAL BUDDAH	Spartacus	SQUARY	Preset Default PROG
73	BorisTheSpider Bass	Bake 'n' Fry	Tomitavox	ORGAN REGION	Horn of Mythos	SYNC 5	Preset Default PROG
74	Lo, He plucks it well	MoogPeow C	Analog Shimmer	SKINNY2	Call of the Gearpig	GETTING NASTY	Preset Default PROG
75	Interval Lead	Basso Flabulo	SoftnHollow	FL's LEAD	Soft as I remember	JAN AND JEFF ARE BACK	Preset Default PROG
76	Wind me up please	Slow Attack	Numanesque Lead	SUNSHINE LEAD	Stereo S&H (wheel up)	BUBBLEBASS	Preset Default PROG
77	LoDownSquare Boy	Rubbery Bass Weird Wheel	PluckyBassy	BRASSED OFF	Harmonized (wheel up)	RHYTHM AND MOOG	Preset Default PROG
78	My Days Bass	4ths Random Trill Wheel	Metal Sizzle Percussion	DIRTY LEAD	Sasquatch speaks up	FROM A DISTANCE	Preset Default PROG
79	My Days Seq 2	Duke	Chordal Mod Surprise	HEAD DUCK*	Bo	AGAIN: TECH NO!	Preset Default PROG
80	My Days Theme 2	Walk away	One Pole Lead	MULTI-LEAD	Some funk for ya'	TYPICAL MOOGBASS 1:1MINI	Preset Default PROG
81	Press2 Glide Theremin	SequenceYourThirst	SubterraneanSquare	IM IN LOVE	Bubbly Lead	JAN HAMMER BASS 1:1MINI	Preset Default PROG
82	Lip Buzz	Picture This	Enoesquepad	AMERICAN DREAM	Synthworld	RECTANGULAR BASS 1:1MINI	Preset Default PROG
83	Organish Lead	Panning Keys	Clustered	HIPASSCLAV	Aleatoric	RIPPER BASS	Preset Default PROG
84	Mosquito Lead	Birdy Bass	Tin on Wheels	UGLY *%!#' FACE	Wheel chorus Lead	FAT BASS	Preset Default PROG
85	Sweeping Bassy 5ths	Job Done	Atomic Geetah	ODDS	Glass Temple	BLOCKBUSTER	Preset Default PROG
86	Velocity Bright Lead	Analog Gongs	Radio Lead	SHAYS DANCE	Repeater Bass	CLASSIC LEAD	Preset Default PROG
87	Velocity Res Lead	No Rest	Dirty Wheels	STAG RADI0	Electro Kid	ARE YOU SQUARED?	Preset Default PROG
88	Weasel Goes Pop	Owwww Bass	Dingy*drops?	SKYCHURCH EVOLUTION	Fuzzy Lead	VELOCITY MODSAW	Preset Default PROG
89	Expressive	Mod my Filter!	AM Radio Strings	RELAXATION DRONE	Catherine of Aragon	BATTLE OF EPPINGFOREST	Preset Default PROG
90	Plucked and Pulsed	Magic Man	Rhythmic Harmonics	DROP WHEEL PUSH	Catherine Howard	POPCORN	Preset Default PROG
91	VelociMoog	Cymbolic	WowowoWheel	SHOCK COIL	Anne Boleyn Bass	HELLO KEITH	Preset Default PROG
92	The Clock Strikes 12	Bomb-Basstic	Knocking Bass	SIZZLE SWEEP	Anne Boleyn Lead	ELP TRILOGY	Preset Default PROG
93	High Velo Lead	Organ '66	Digifone	LONELY TRAINWHISTLE	Raw & melodic	AQUATARKUS	Preset Default PROG
94	GetFifthy	80's Seq	Growing Shifter	ALIEN STUTTER	Sweepy Bass	MOOG PERCUSSION	Preset Default PROG
95	Pulsing Syncer	Bass Drum w/Wheel FM	Sky Saw Sync	MINOR 7TH AND 5TH	Green Fog	BUZZY BASS	Preset Default PROG
96	Cluster Drum	Yc45 RM	Pulsing Bass	PUSH->CLOSEDLIFT->OPEN	Wrong Crypt	VULGAR BASS	Preset Default PROG
97	Skinny Keys	Pre-Mental Tension	Water Wheels	MY FLOWBEE	Just the harmonics	HIP AND HOP	Preset Default PROG
98	Treasure Lead	Strange Growth	Riser	WIZARD OF MONTARA	Thematic	ANCIENT BELL	Preset Default PROG
99	Detuned Vox	Katy's Moog Bass	Electrozap Bass	DENTISTRY	Plucky Bass	BIG IN THE 80S	Preset Default PROG
100	Velocity Res Bass	Get the Kleenex	AlienKalimba	CHADZARSE	Bright Bass	REMINDER OF JASPER	Preset Default PROG
101	Sub Teach	Behave You Hussy	Sub-Growl	TOUCHPAD FX	Tubby Bass	ALIENATTACK TRY MODWHEEL	Preset Default PROG
102	Slow Mod Panning Lead	Thumping E-Bass	Guess Woo? Yoo!	MOD WHEEL BUBBLER	Alien Metal	ANYONE OUT THERE?	Preset Default PROG
103	Mix Hog Bass	Minimoog 70's	Da' Bass Drum	PANNING AAOW	NOT Unplugged	SQUEEZE IT! TRY MODWHEEL	Preset Default PROG
104	Pastoral	Yowsa Bass	Little Ringer	R2 CPU	Bass Phenomena	HELLO LYLE!	Preset Default PROG
105	Bright Pluck Sync	JP Lead 1	TDarpeggio	FLANGE SCRAPE	Reedy Bass (use wheel)	JAN MEETS AL	Preset Default PROG
106	Space Strings	Weird Bells	Hornz	THE LIGHT	Dramatic Entrance	HAMMOND B5	Preset Default PROG
107	Space Whistle	Finsbury Park	Rezzorama	DARKNESS	Flying Toy	INDUSTRIAL	Preset Default PROG
108	Classic Lead	Long Slow Growth	Marimboid	ASHES TO ASHES	Alley Cat	MOOG 55	Preset Default PROG
109	Bright One	Really GrossMod Wheel	Slow Sweep Runner	ARP MOD PAN	Speedway	DEFUNKED DX7 RHODES	Preset Default PROG
110	Zapper	Mod Sweeper Bass	Dark PWM Bass	CLAV DELAY	Call the plumber	ROTAROTATING	Preset Default PROG
111	Sweep	Little Mooger	Panning Chimes	SWITCHED ON!	Sweet Thing	NO MUTES!	Preset Default PROG
112	This Story Theme	Lucky Man	Fat Skinny Bass	LITTLE BELL	Tribal	EARTH WIND AND BRASS	Preset Default PROG
113	This Story Seq 2	Dripsodic	70s Leadz	TWINK BLIPS	Plucked Lead	HIP HOP, BRASS	Preset Default PROG
114	This Story Theme 2	How Deep	Slow Pitch Slider	BIG LOW DRUM	Hollow Fuzzytone	TECHNO POWERSTATION	Preset Default PROG
115	This Story Bass	Sunrise	Insyncerator	CIRCUIT DRUM	Sizzle Bass	E-DRUM	Preset Default PROG
116	Wet'n Wobbly PopTop	Over Zealous	Hobbes Knobbs	NOISY PERCUSSION	Fly by	DREAMING TECHNO	Preset Default PROG
117	Metal Junk Percussion	Slow Stereo Square Bass	String Thing	REZ DRUM	Short lived	BIG BRASS	Preset Default PROG
118	Double Touch Theremin	Minotaur	Bwa Machine	DUB STYLEY	What the...	TOTAHORNS	Preset Default PROG
119	Slightly Messy	Lava Surfing	Flashlite 2004+	DRUM FROM MARS	Harpsinotes	SLOW BRASS	Preset Default PROG
120	Sync Mini (AT)	Chalameau Bass	Velocity Blipz	XFITZ~~~	Not small	TRUMPET	Preset Default PROG
121	DozingInThe Afterbuzz	From The Beginning	Hairball Bass	TWISTER PERCUSSION	Tiny flute	HELLO MILES	Preset Default PROG
122	The Lair of Dr Vile	Wheel Sync Runner	TouchActive FX	POPTART DRUM	Cosmic chatter	PLAY A RHYTHM + MW	Preset Default PROG
123	Don*t Forget to Sweep Up	Random Pan Triangle	Sub Sub Bass	TEKKIK``	Ridin' the storm out	HI EDGAR!	Preset Default PROG
124	Free Noise	Emerson Saw	Kaotik (wheelup)	ELECTRO PERCUSSION	Large fifths	SAGA SWEEPER	Preset Default PROG
125	Disaster Sync	Velocity Square Drumz	Harpsimoog	MIAMI DROP BASS	Fanfare	OFFRAMP	Preset Default PROG
126	My Broken Shortwave	GentleRunner	Sync Drum	SKYCHURCH TOUCHPADRUM	Synergistic	RHYTHM AND MOOG	Preset Default PROG
127	Panning Growth	Yeeeaaaayy	Cottonmouth Lead	SHARDS	Bass for E. Vonallen	KNOCKING ON THE MINI	Preset Default PROG
128	Stuttering Evolution	Big Bang	On the Horizon	GALACTIC DROPS	Windy night	SIMMONS DRUM	Preset Default PROG